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Issue 075 November 2011

Kenichi Nishida

3DCreative interview this fantastic Character artist

Jin Hee Lee, Arturo Garcia, Hugo Morais & more!

Gallery - 10 of the best images from around the world!

"FAUP - Path to Knowledge"

Project Overview by Jacinto Monteiro

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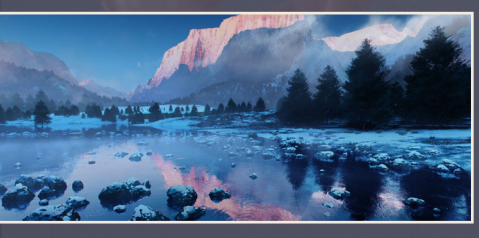
THE SCORPION

Taking the sting out out of modeling Borislav Kechashki shares the process he used to create his stylized character.



Futuristic Vehicles

Dhilip Somesh concludes our **Futuristic Vehicle** tutorial series, this time looking at creating a Resource Collector.



Vue Environment Creation

Bringing us the final chapter of our **Vue Environment Creation** series, **Alex Popescu** creates a stunning image of a River Valley .



Sword Master 2

Last month **Gavin Goulden** began our **Sword Master 2** tutorial series and Gavin is back again this month to show how to sculpt our model and more.

Cover image by Borislav Kechashki



Editorial

Well I hope you all had a great Halloween and have been enjoying munching your way through all your treats, or still laughing about your tricks. November is here, the nights are darker and firework season is upon us. There is no need for us to wait until the 5th of November to get things off to a bang though, simply flick through this month's explosive magazine!

Are cartoon animals series has been great so far, with many of the fantastic images making their way onto the cover of the magazine. This month's cartoon animal is no exception. Borislav Kechashki uses both 3ds Max and ZBrush as he talks us through the creation of his stunning cartoon Scorpion. This is a great little tutorial that covers a little bit of everything, so if you are thinking about starting a new project this would be a great starting point.

I hope you all enjoyed the first chapter of our new Swordmaster series. If you missed the first chapter, make sure you pick up last month's months magazine so you can follow the latest installment where Gavin Goulden will be talking us through the sculpting process. This is a really great series made up of step by step instructions that if followed to the letter will ensure that you to make a stunning games character.

I don't know about you but I have been really enjoying Dhilip Somesh's Futuristic Vehicles tutorial series. Making the most of both 3ds Max and Photoshop Dhilip has been showing us how to make stunning stills of Futuristic Vehicles. In this issue he will be turning his attention to a big, bulky, dirty resource collector. This is a great way to get stunning results in a short period of time and is well-worth ago.

I am sure all of you Vue users have been loving Alex Popescu's stunning insight into the software. Alex has done a great job of talking us through both technical and artistic decisions and in this final chapter of his series he will doing more of the same as he talks us through creating a snowy, mountainous scene. There is no need to be sad though as next month's we will be replacing this series with a great set of tutorials about Topology.

This month's interview is with an amazing artist who specializes in the use of Mudbox. Kenichi Nishida tells us a little about how he got into the 3D industry and the techniques he uses in his every day work. From Mudbox sculpting to 3ds Max Interiors our interview and Making Of couldn't be more contrasting. In this month's Making Of Jacinto Monteiro will be showing us how he created his stunningly realistic image of the library at the University he studied in.

This just leaves us with this month's gallery which (as always) is full to the brim of some of best of the current 3D artwork in the community. This month's gallery features work from Mathias Herbster, Francesco Corvino, Jin Hee Lee and many more amazing artists.

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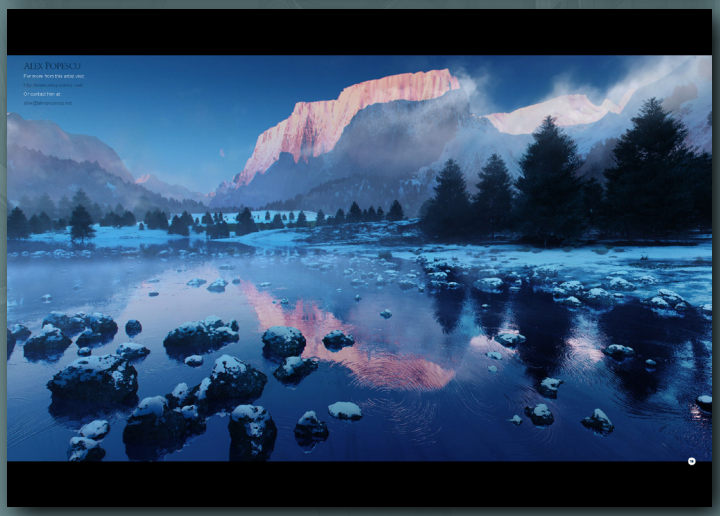
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That's it!



Contributing Artists

Every month artists from around the world contribute to 3DCreative, and you can find out a little more about them right here! If you'd like to get involved in the 3DCreative magazine, please contact: simon@3dtotal.com





Gavin Goulden

Gavin Goulden is a character artist for Irrational Games working on Bioshock Infinite. With 6 years games industry experience, he has contributed character and environment art assets to multiple titles including Dead Rising 2, The Bigs 2, Damnation and FEAR 2.

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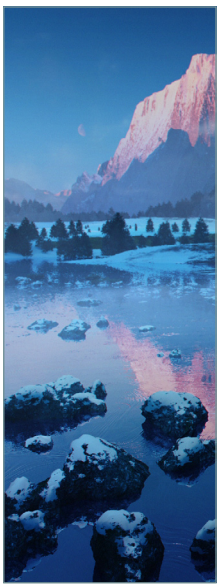


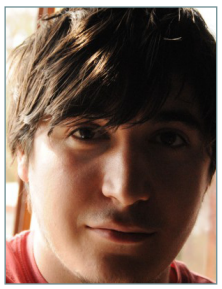
Kenichi Nishida

Kenichi Nishida is currently the senior modeler at Marza. His work has predominantly been in the film and games industries. He has won awards in the past for his use of Mudbox and has made many tutorials about the use of it.

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Alex Popescu

Alex Popescu works in the visual effects industry specializing in film work. He concentrates on digital set creation, environment design and concept art. He also works on set extensions and 2D matte paintings. At the moment he works as a Lead DMP\ Environment artist at MPC London.

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Borislav Kechashki

Borislav Kechashki lives in Sofia, Bulgaria where he graduated from his architecture degree a year ago. After working for more than 3 years as an environment artist in a small game studio, he is currently working as a 3d character artist at Ubisoft Sofia.

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Would You Like to Contribute to 3DCreative or 2DArtist Magazine?

We are always looking for tutorial artists, gallery submissions, potential interviewees, 'making of' writers, and more. For more information, please send a link to your portfolio, or send examples, to: simon@3dtotal.com

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KENICHI NISHIDA

Kenichi Nishida is a character artist working in Tokyo. With over five year's experience, he currently works as a modeler on CG animations. Among his portfolio is a piece entitled A *Little Warrior*, which won first place earlier this year in CG Hub's Mudbox challenge.



"WE'RE JUST USING DIGITAL TOOLS INSTEAD OF PENCIL, PAPER AND CLAY ETC. I THINK THAT BOTH DIGITAL AND TRADITIONAL WORK SHARE SIMILAR FUNDAMENTALS."

Can you first of all tell us a little about your current job and what you are doing at the moment?

Okay, I'm Kenichi Nishida, born in Tokyo, Japan. At the moment I'm working for Marza (we spun-off from Sega to produce CG animated films.) as a senior modeler. I have five years expertise, mainly in organic surface modeling. Our studio has an upcoming project, called *Space Pirates Captain Harlock*, which we're working on now.



Having recently started clay sculpting, can you describe how it compares to the digital medium and the benefits of working in a traditional manner for someone in your line of work?

I've just recently started clay sculpting in my spare time, so it's difficult to describe the differences exactly. Of course you can't use "undo", "mirror copy" or other tools on traditional works and, as you know, these features are definitely helpful in digital work. We learn anatomy, which is very important as a digital modeler, but clay sculpting should also be just as important. Learning these traditional skills will help improve your digital work. These days, I'm examining traditional works more than digital works.

Which of your models are you most proud of and why?

Of course, it's my latest work, *A Little Warrior*, which I was awarded first place for. In addition,



I received some complimentary comments from legendry judges, which was a great honor. I have never been awarded first place before, so I was really proud when I heard the news. I think I'll try again when I find a good modeling challenge.

What was the inspiration behind *A Little Warrior*?

I wanted to try to create a unique character for that challenge. I didn't want to create an ordinary muscular warrior so I tried drawing many sketches to find a unique style. And, of course, there is also a story that goes with the character. When I was sketching I gathered many examples of fantasy artwork and photos.

Within those references, I was particularly inspired by Jean-Baptiste Monge, who is one of my favorite artists.

I was intending to make a small frog as the warrior's buddy instead of a crab, but I wanted to include different materials in the image such as organic parts and hard surface components such as shells. As for the warrior design, I used many photos of bush-men, who are the indigenous people of southern Africa. They don't have muscular bodies, but I felt they demonstrated a powerful culture and lifestyle.

What do you feel are the greatest challenges facing a character artist these days and what tips would you give to someone wishing to pursue such a career?

I have occasionally thought about this topic lately and feel that the greatest challenge facing a character artist is in learning more traditional methods like clay sculpting etc. We character artists usually prefer to use powerful digital sculpting software and can make detailed models easily and quickly. I think the software is really useful and helpful for our work, but if possible we should dedicate more time to traditional arts or basic modeling without the software.

> "One of my favorite forums is CG Feedback, and thanks to this, I can discover my problems and weak points, and address them in my work by fixing them."

Some people may argue that a digital artist does not need to study traditional methods. What would you say in response to this?

It's kind of difficult to answer this question, because I think there are some other ways to improve your skills. If you're a character modeler, you may need to learn character rigging and animation, but I think traditional art really helps towards modeling and I believe it is one of the best ways to improve.

For example, in another department an animator may need to learn about drawing a pose or a lighting artist may need to understand real lighting with a camera. We're just using digital tools instead of pencil, paper and clay etc. I think that both digital and traditional work share similar fundamentals. Of course, I'm still learning the fundamentals of these traditional arts in order to become a talented artist.

If you could summarize the things that have had the biggest impact on your artistic development so far, what would they be?

Definitely my friends and great artists. It's easy to meet a lot of artists on the CG forums and I







can also discuss my work. One of my favorite forums is CG Feedback, and thanks to this, I can discover my problems and weak points, and address them in my work by fixing them.



If you were given the opportunity to work on a project, what would it be and why?

I'm currently searching for an opportunity at the moment. If I had the chance, I'd like to be involved in a film project for a major studio because I don't have any experience in this field. I think every artist has a similar aim to want to work for a major studio. Fortunately I have a lot of friends who are working in this area, so I'd like to join them on any of their projects.

Are there any films that you have seen and thought you would love to have been involved with, particularly from the perspective of character modelling?

I have some favorite CG characters: Gollum, Na'vi, King Kong, Yoda, Davy Jones and so on. They are already well-known and popular characters. If possible, I'd love to be involved with these major projects as a character modeler. My aim currently is to search for good opportunities for which I'm improving a variety of modeling skills.

What, if anything, do you particularly strive towards when modeling your creatures and characters?

When I do modeling work, I'm always striving to achieve a compelling form. For that reason I usually start to try and look into primary form and structures. Of course, I need to know about the background of the characters/creatures, such as what kind of personality do they have? Or what kind of environment do they live in? I strive to share the story of the character through the work as much as possible.



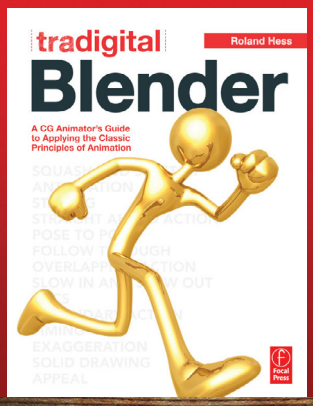


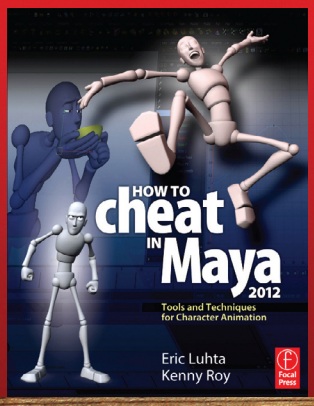
Kenichi Nishida

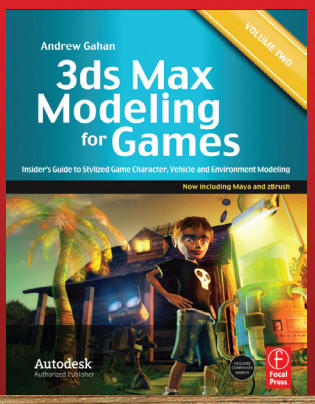
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Interviewed by: Rich Tilbury

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Ready for adventure
Luxology®
modo® 501 image by Robert Lechl

THE GALLERY



This month we feature:

Bge

Hugo Morais

Arturo Garcia

Francesco Corvino

Ondrej Virág & Lukáš Hajka

Jin Hee Lee

Yaroslav Grigoras

Shi Yao

Karol Wlodarczyk

Mathias Herbster

ELEKTRA

Yaroslav Grigoras
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(Right)





THE LIZARD KING

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Traffic Lights

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Sci-Fi Skrunda

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(Left)

Sci-Fi hallway

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(Below)



An Afternoon

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Ferrari 340 M back to life

Arturo Garcia
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(Above)



Oldman

Jin Hee Lee
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(Left)

Warrior-B

Bge

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SWORD MASTER 2

FOLLOW THIS TUTORIAL SERIES ON PAGE 066

Chapter 2 - Sculpting

In 2006 3DTotal created some groundbreaking training that quickly made a name for itself as one of the best 3D training resources available; that series was called the Swordmaster! Well five years later the Swordmaster is back and better than ever. In this series industry professional Gavin Goulden will be talking you through how to take a concept and turn it into a top quality character ready for use in a game. From basic modeling through to sculpting and texturing, Gavin will cover every step in great detail so that even an inexperienced 3D artist will be able to comfortably follow this series.



Coming up in this issue...

This month Gavin Goulden will show you how to sculpt the model.

So if you're interested in seeing the second chapter of this great series, please flip to the back of this magazine and enjoy.

3ds max - Page 066
Maya - Page 100

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Image provided by Avner Engel
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FUTURISTIC VEHICLES



Futuristic vehicles are a common subject matter in the CG world. However, creating a complicated model that then needs to be textured and lit can be a time-consuming process, which is only necessary if the model is to be animated later in the process. If you are creating a still there is an easier way that will save you a lot of time and still produce equally impressive results. In this series Dhilip Somesh will be showing us how we can create a simple 3D model which can then be textured, painted and lit in Photoshop to create amazing futuristic vehicle illustrations.

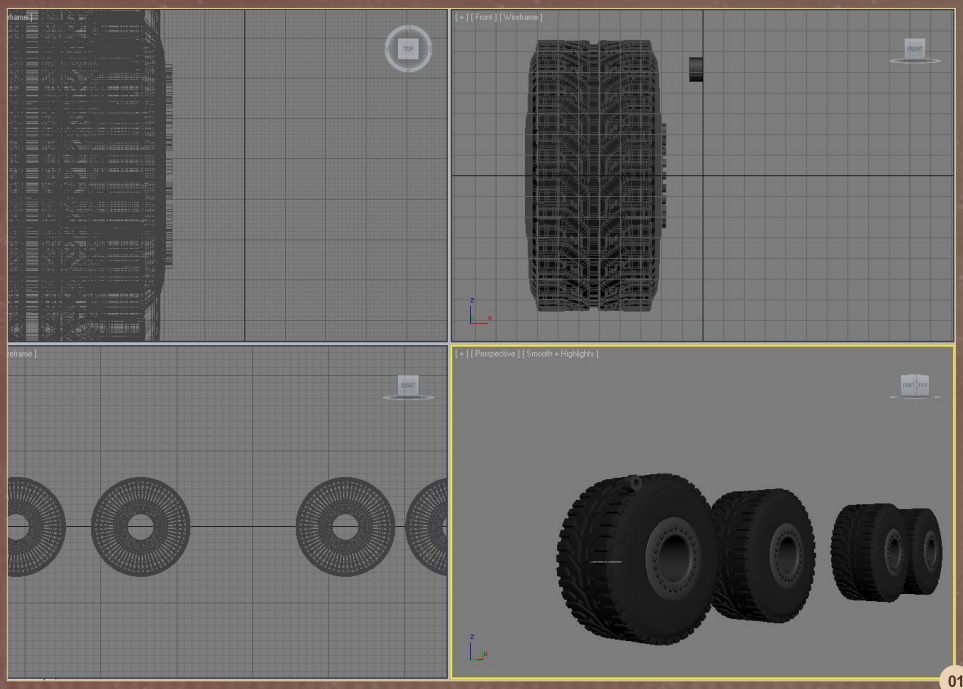


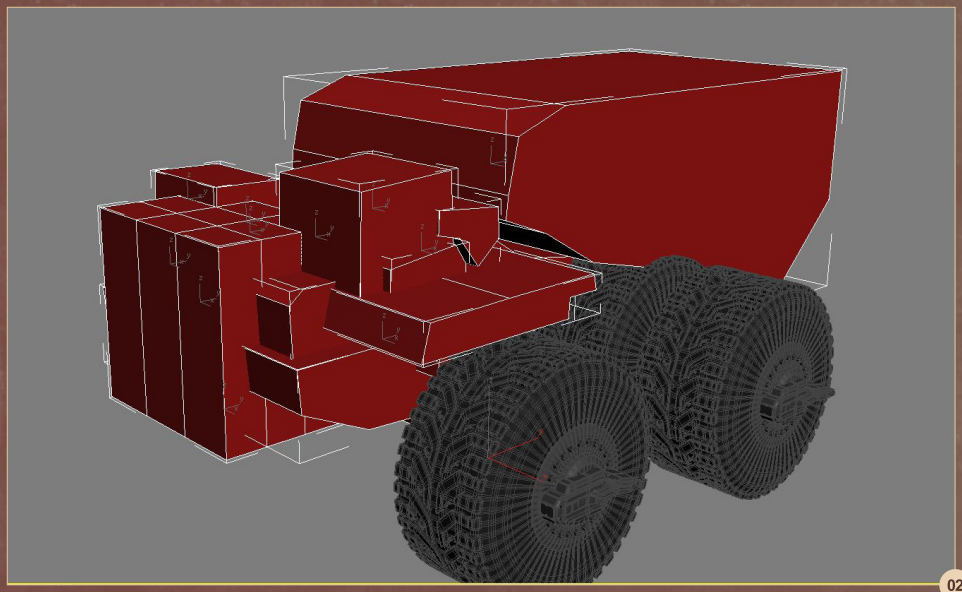
SEPTEMBER ISSUE 073 Chapter 01 | Amphibious Vehicle
OCTOBER ISSUE 074 Chapter 02 | Vectromer
THIS ISSUE Chapter 03 | Resource Collector

CHAPTER 03 - RESOURCE COLLECTOR

Software used: 3ds Max and Photoshop

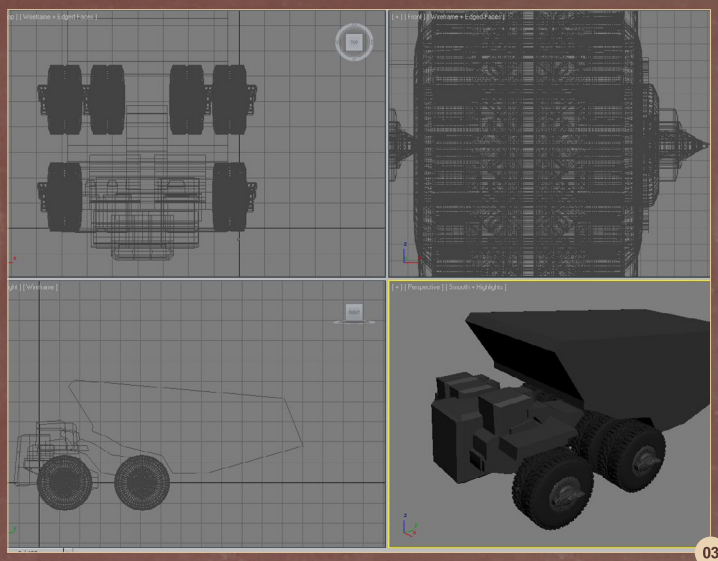
I started the creation of this new vehicle by looking at reference images of earth movers and big CAT vehicles on the internet. Once I had done that I began to create a clear picture in my mind of how I wanted my Transporter to look. As usual I started by designing the tires (**Fig.01**). Fixing the tires in place at the beginning helps to define the scale, height and capacity of the Transporter. Although it is helpful to put this in place at the beginning it can be adjusted later if your design requires it. I used basic shape tools to create the tread on the tire and used paths to deform them.

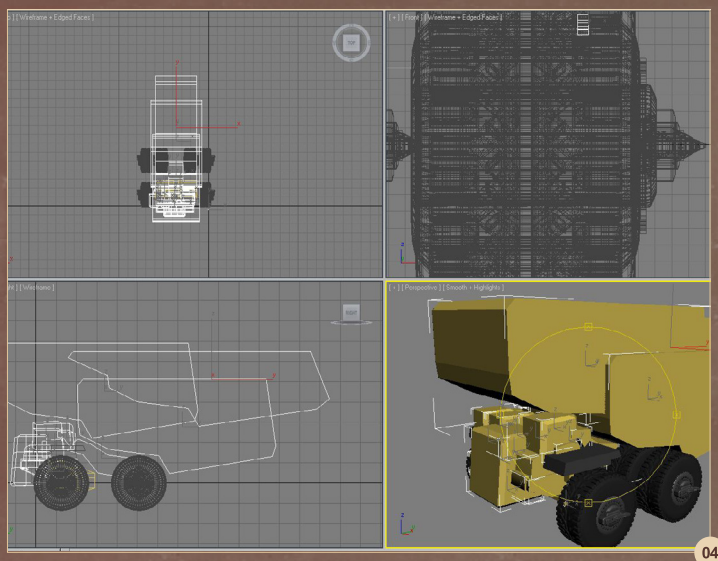

01


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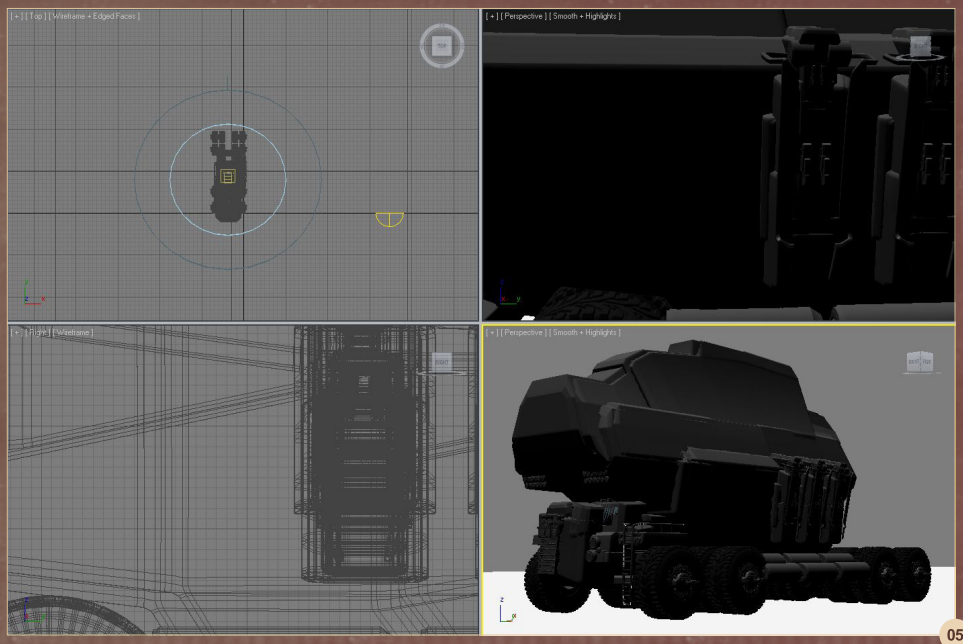
After fixing the wheel base in place I create a rough block-in of the main body of the vehicle using the shape tool in max (**Fig.02**). This is the point where I can start to institute some of the ideas that I had when I was going through the references. This process took me about 5 hours. Even at this point when the structure is looking quite established you should not feel too restricted. If you decide something would look better later, change it.

As you see in **Fig.03** I continued to develop the basic shape. Again you can see more changes in **Fig.04** where I started to head for a more truck like design.


03


04

After this stage it was just a case of polishing and enhancing the form of transporter until I had something I was happy with (**Fig.05**). As you can see I have created another set of wheels to complete the design of the vehicle. When I got to this point and the design was complete I could start searching for convincing angle to portray the vehicle from. I could also think about the lighting and the overall look that I wanted in the final image (**Fig.06**).

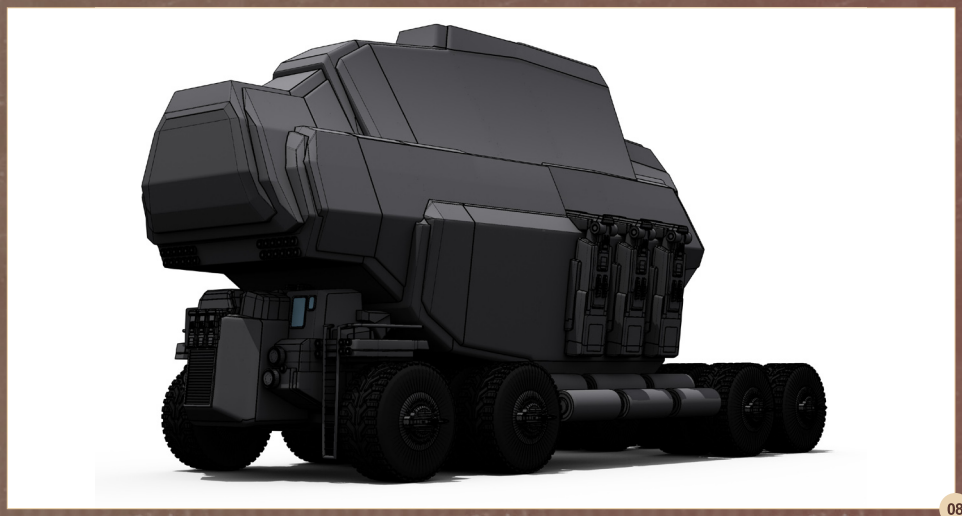

05

I created some basic renders in Max (**Fig.07**) and took them to Photoshop to start adding the details. You can see in **Fig.08** that I started by using the same technique as I did in the other tutorials, by using the Pen Tool in Photoshop I lay out all of the hull detail. Also note the use of different brush sizes. This is to demonstrate the thickness of the plates on the vehicle. **Fig.09** shows some vents and groves that either came across from the 3D model or that have now been added or corrected.


06


07

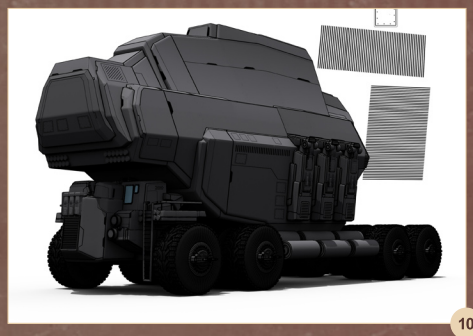
I have created some basic templates in Photoshop which I can almost use like stickers to add to any part of the vehicle that I want. All I need to do to add them is to scale or twist them slightly to fit the perspective. The general idea you can apply is that everything that comes out of a factory will have lot of repetition and rhythm. This is done to reduce the cost of manufacturing. These template layers can be created using the same Pen Tool with various line weights (**Fig.10**).


08

This is how I created the vents on the vehicle:

1. Use Ctrl + M which opens the selection tool.
2. Create a new layer.
3. Create a horizontal box with the selection tool, so it looks like a thin strip.
4. Go to Copy Transform Mode by Holding Ctrl, Alt and T.
5. Move the line and it will make a copy of it.
6. Move to your desired location and press Enter.


09


10

7. Hold Ctrl, Alt, Shift and press T to apply your previous transform to a new copy of the strip layer.
8. Hold Ctrl, Alt, Shift and press T to create as many lines as you want.
9. When you have created enough select all the layers and press Ctrl E to merge.

Now you have all the lines you need and you can simply add them to your vehicle wherever you like. Like the details I mentioned earlier you can twist and transform these to fit your design and match the perspective.

The same technique was used to create the honey comb grill and shaft you can see in **Fig.11**. Although this seems like an easy approach it should be done carefully, you don't want it to affect the scale of the vehicle. This technique can be used to create a huge variety of details and features. The only limit is your imagination.

The next thing I did was to add some dirt to the transporter (Fig.12). As you can see I created some brushes for the dirt made from simple dirty looking alphas. These can be made using a combination of brushes and erasers whilst adjusting the parameters like scatter etc.

The next step is to adjust the color of the vehicle. I do this using color balance which is an adjustment layer found under the Layers tab (**Fig.13**).

I love the phase where I get to add the Decals. This stage grounds our subject vehicle perfectly. Sometimes I collect images from the internet and use them or create costume shapes in Photoshop. I added them to new layers and transform them to fit the shape of the hull and so the perspective looks correct. The Black and Yellow caution strips are created in the same way as the vents I gave details about earlier. I also add highlights at this stage to show up the areas where the materials are most reflective (**Fig.14**).


11


12


13



14



15

I find that adding warning lights animates the whole vehicle (**Fig.15**). These can be added and adjusted in a separate layer to make beautiful effects. Make sure you don't add too many as it may begin to look a little awkward. I also used an Air Brush to create the light effect and applied a lens which helps to place our vehicle in an environment.

In the final image (**Fig.16**) I used chromatic aberration to get the realistic feel and skewed the image to accentuate the size and heaviness of the vehicle.

DHILIP SOMESH

For more from this artist visit:
http://nullworld-3033ad.blogspot.com/
Or contact him at:
dhilipsomesh@gmail.com



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Solutions for Your Digital Nature



Vue image by Kazuya Hashimoto (winner of the 3D Environment Competition 2011)



Vue image by Luigi Marini



Vue image by Thomas Godenrath



Vue image by Lutz Lehmann

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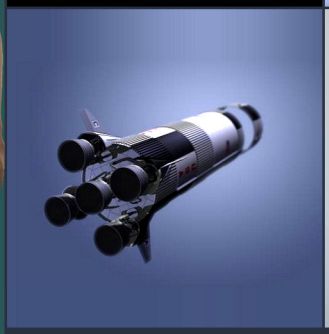
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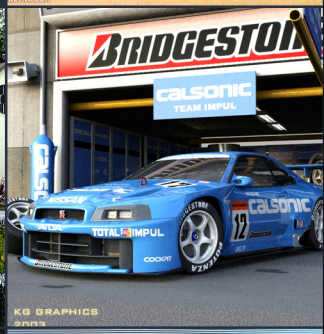



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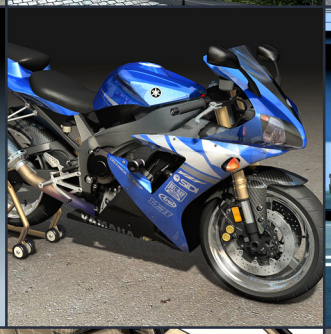
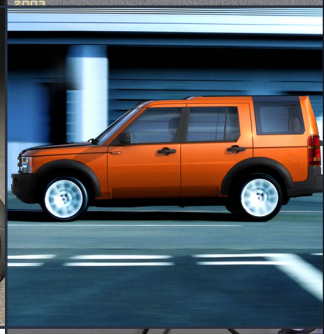
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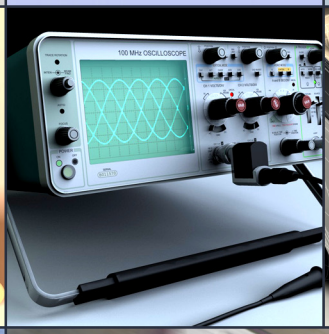




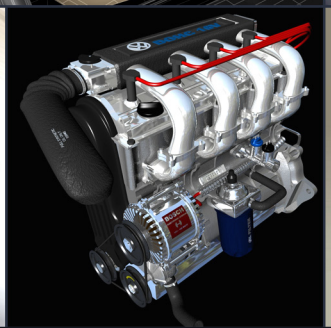










CARTOON ANIMALS

Creating cartoon animals is a great starting point for anyone who is thinking about having a go at 3D. Cartoon animals are usually made up of shapes and forms that are fairly simple to model and since realism is not the focus of this kind of work, it gives you an opportunity to be expressive and experimental at all points of the creative process. In this series our artists will be talking you through how to approach this task, firstly by concentrating on how to create your idea, but then moving on to the modelling, texturing and post-production. Each chapter provides you with an opportunity to see into the workflow of these industry professionals who will give you a priceless insight into what is a huge part of the CG industry.



5

JULY ISSUE 071 Chapter 01 | Mosquito AUGUST ISSUE 072 Chapter 02 | Emu SEPTEMBER ISSUE 073 Chapter 03 | Armadillo

OCTOBER ISSUE 074 Chapter 04 | Squid THIS ISSUE Chapter 05 | Scorpion NEXT ISSUE Chapter 06 | Sloth

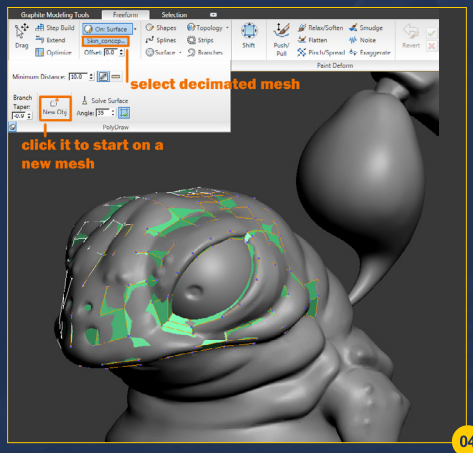
CHAPTER 05: SCORPION

Software used: 3ds Max and ZBrush

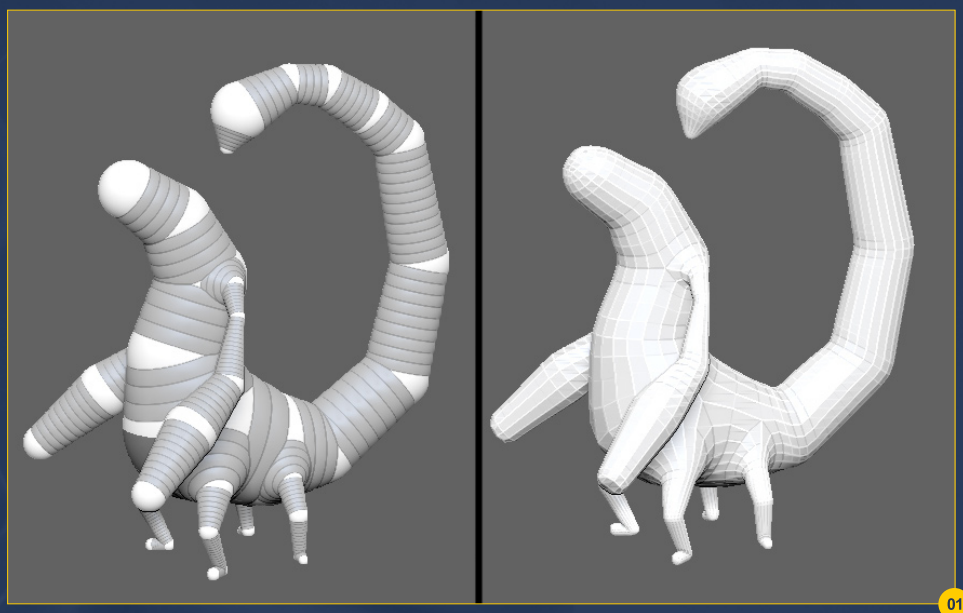
It was quite a challenge to come up with an interesting and original design for this creature, mainly because scorpions don't have easily readable mouths and eyes to play with, and I had to change the face dramatically. After some really fast and rough sketches I moved to ZBrush to continue my concepting directly in 3D.

It's awesome how fast you can visualize your ideas with ZSpheres and make changes to them directly in 3D. When working with ZSpheres it's helpful to press the A key from time to time to preview how your mesh looks. I created a result I was happy with (**Fig.01**) and then converted my ZSpheres into an adaptive skin so I could begin detailing the model.

Because I didn't start with a clear concept I started by working with the Move brush on a lower subdivision level so I could experiment with the proportions and silhouette of the character. My aim was to finalize the concept before moving on with the detailing. The next step was to start adding some major forms and large details, working mainly with the Clay Buildup brush with a round alpha in combination with the DamStandard brush (accessible through Lightbox). Through most of the sculpting process I worked with these two brushes. I moved slowly through the subdivision levels, trying not to have more polygons than I needed. **Fig.02** shows the development.



04



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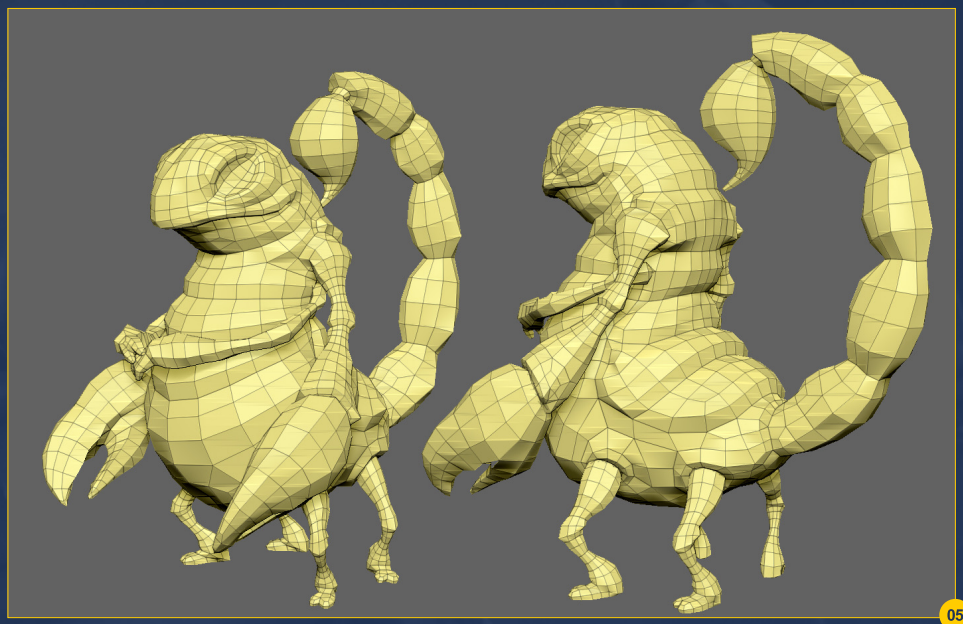


03

I tried not to go into too much detail at this point because I planned to adjust the topology later in 3ds Max and then re-project the details in ZBrush. This way I was able to work with a better polygon distribution. When I was satisfied with the proportions and the form I decimated the whole model to a poly count that I could easily work with (**Fig.03**).

I used GoZ to move the model to 3ds Max and began retopologizing. I worked with 3ds Max's retopology tools, but the idea is the same with Polyboost or whichever other tool you choose to use. Now was the time to think about which part I wanted as a separate subtool, and make it into a new object (**Fig.04**).

As the model was not going to be animated, the loops and flow of the geometry was not that important at this point. However I tried to make sure it was made of evenly distributed four-sided polygons. For the arms and the feet I only made one mesh of each type, which I duplicated later on in ZBrush. When done with the retopolgy of every single subtoo,l I put an STL Check modifier on each one so I could make sure that there were no open edges or vertices left from the symmetry. It's always a good idea to have everything capped if you plan to project details later in ZBrush. When the meshes were ready I used GoZ to move them back into ZBrush so I could project the details on them (**Fig.05**).

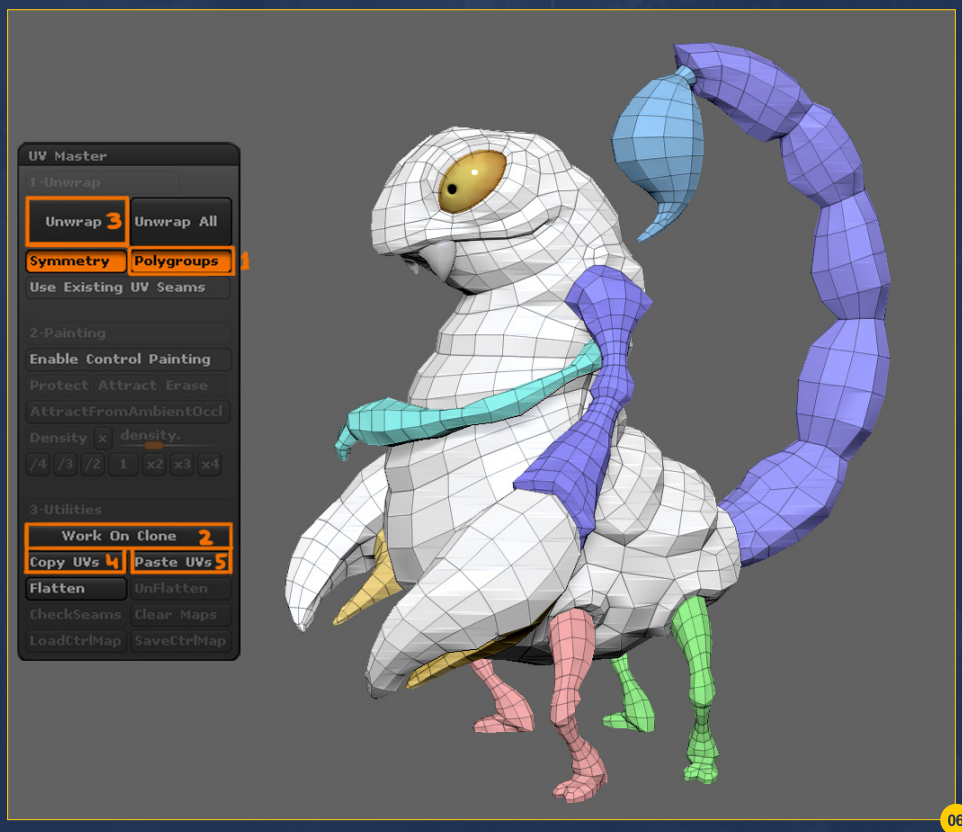

05

A good technique I used at this point was to subdivide the new subtool several times, so I had enough geometry to capture all the detail I needed. I always make a morph target so I can easily morph back areas which have not projected correctly. I also mask the areas that don't need any details projected on them (like the capped areas on the arms and the feet in this example) and start projecting, from the lowest to the highest subdivision.

Once I was done with the projection on all the subtools, I continued sculpting with the Clay Buildup and DamStandard brushes. I started by working from the bigger detail to the smaller parts. It's easier to experiment with different types of detail in different layers and by playing with the layer intensity slider.

For the arm and the foot I sculpted all the small bumps on a separate layer, so later on when I duplicated these to make up the remaining limbs I could turn off the layer and make them more unique.

At this point I was almost done with the sculpting. I gathered some quick UV maps of all the subtools so I could export the textures into Photoshop later for some tweaking if needed (although, as it turns out, this didn't happen and this step was pointless).



06

I created a separate polygroup for each UV island by isolating different parts of the mesh using a Lasso selection and the Grow and Shrink functions in the Visibility menu. I then grouped visible items from the polygroup menu.

Once all the polygroups were set, using the UV master I clicked on Polygroups followed by Work on Clone and then Create the UVs. They can be manually tweaked further by clicking Flatten and using the Move brush (**Fig.06**). When I was satisfied with the mapping I just copied the UV and then pasted it back on the original mesh (to check your UVs, go to Texture > UV Check).

I was done with the sculpting and mapping at this point (although I always tweak details throughout the process). I therefore started doing some color tests using Polypaint. I worked at a larger scale at this point and



took screenshots which I then manipulated in Photoshop to check different color combinations. When I'd found the colors I was happy with, I began adding smaller detail and some color variations to the texture. I mostly worked with the Standard brush, with a spray stroke and no color intensity variance. I chose a spray-looking alpha (like alpha 07 or 08) and just varied the draw size of the brush. Although it's not common for scorpions, I painted some warm-blooded features like a warmer colored nose, knees and fingers.

At this point I painted the eyes and the teeth with the toy plastic material to distinguish them from the body material. I constantly used the Mask by Cavity function to darken the concave areas or make some bumps and variations in the texture. As for the legs and the arms, I duplicated them after they were mapped and polypainted, then just made a texture from Polypaint and assigned that texture on each of the copies. Then I selected Make a Texture from Polypaint and added some variations to each one. Another cool thing is that you can add detail and painted information at the same time by clicking both the RGB and the Zadd buttons, which is handy in some situations and saves you masking later on (**Fig.07**).

At this point the image was more or less done and I was happy with the texture. I then posed the character to break the symmetry. At this point I knew what pose I was looking for and how I wanted the final render to look. The main aim was to avoid bad intersections between the different body parts viewed from the final angle. I did this using the Transpose Master and its topological masking function (Ctrl + drag on the geometry).

The only thing left to do before rendering was to do a bit of sculpting and add smaller details to further break the symmetry (**Fig.08**). The final touch was to model all the other elements of the image – the glass, towel, olive and base on which the model is standing.



The compositing part is the hardest to talk about. I did this in a chaotic way with no exact idea or plan. First of all I downloaded some matcaps from Pixologic's download section for the glass and liquid. This is the breakdown of the materials used for the final image (**Fig.09**).



09

Then I rendered some basic passes to start working with a BPR render with all the textures and materials, AO, shadows, reflection and fall-off passes (**Fig.10**). After combining them in Photoshop I started thinking where it would be cool to have specular and rim lights, and I rendered all those passes with Polypaint turned off and a black color on the model. I did this by moving the lights (double clicking on the light will send it behind the model so you can achieve the rim-light effect). I set up three lights and two basic materials for the scorpion's body. There is one material with a softer specular for the softer parts of the scorpion and one for the rest of the body. This way I rendered two versions of the specular pass for each light (**Fig.11**).The last set of passes was the selection pass (**Fig.12**).

As I said I didn't have a specific technique here, I just played a lot with color balance and masks (a cool trick here is to lock your adjustment layer to the layer below it by clicking the Alt key between the two layers). Sometimes I went back and made some minor details on the model where the rim lights went so it caught the light better. I then rendered the pass again. When all the masking and blending of layers was done I copied all the layers and merged them into one on top of all the others. I then used Gaussian Blur on the new layer and set it to Overlay. This made all the colors more vivid and added a bit of glow on the brightest areas. The last step was to apply a lens blur using the ZDepth pass. I then sharpened it a bit and added vignetting and noise. This is what I ended up with (**Fig.13**).



10



11


12

Borislav Kechashki

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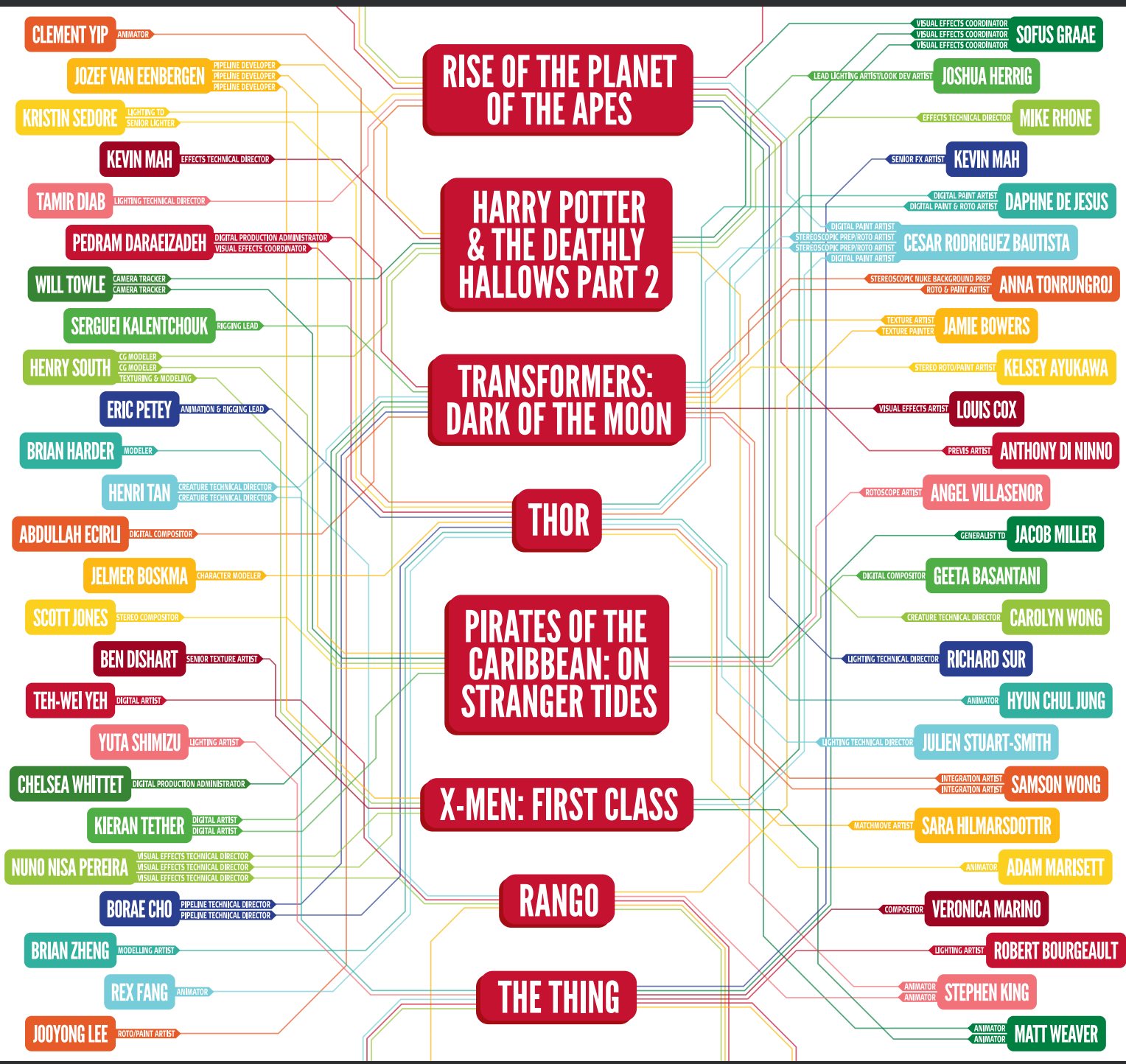
In this two volume series, Scott Patton shows the processes he uses to create a 3D character for feature films. The first volume explores Patton's fast and efficient method for concept sculpting, skipping the 2D sketch phase all together and designing the character entirely within ZBrush®. He covers everything from blocking out the forms and fleshing out the muscles, to adding props, detailing with alphas and posing the character. The second volume covers methods for creating a final color rendering using ZBrush and Photoshop®. Patton shows how he squeezes the most from ZBrush's powerful renderer to create both a wide and close-up shot of the character. He then shares creative Photoshop tips and tricks to quickly get to a finished piece of concept art from the ZBrush renders, covering topics such as adding and refining skin texture, hair, eyes, shadows and scars. Patton also discusses how to create backgrounds that enhance the character and overall composition.

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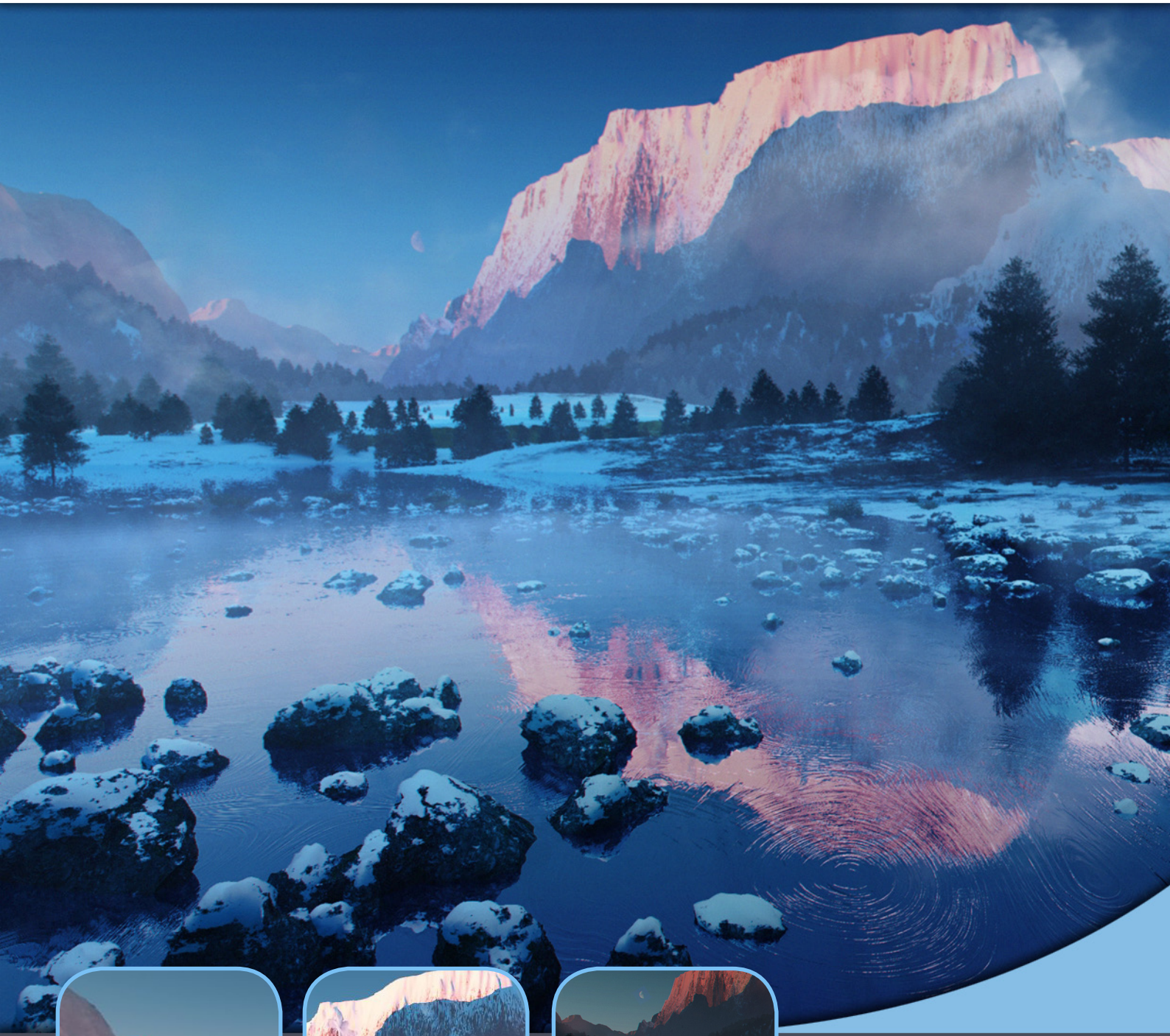
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VUE ENVIRONMENT CREATION









Chapter 4 | River Valley

Vue is a fantastic piece of software that is being used more and more in the movie industry to create beautiful, realistic environments. It can meet the needs of almost any artist in any situation and, as with most CG packages, the only limitation is your imagination. In this series Alex Popescu will be exploring how to get the best out of this versatile software, talking us through all the options on offer and looking at the ways in which Vue can be used to create stunning environments and back-drops. If you are interested in Vue as a piece of software, or if you are thinking of having a go at creating CG environments, then this tutorial is the one for you!

CHAPTER 4 - RIVER VALLEY

Software used: Vue

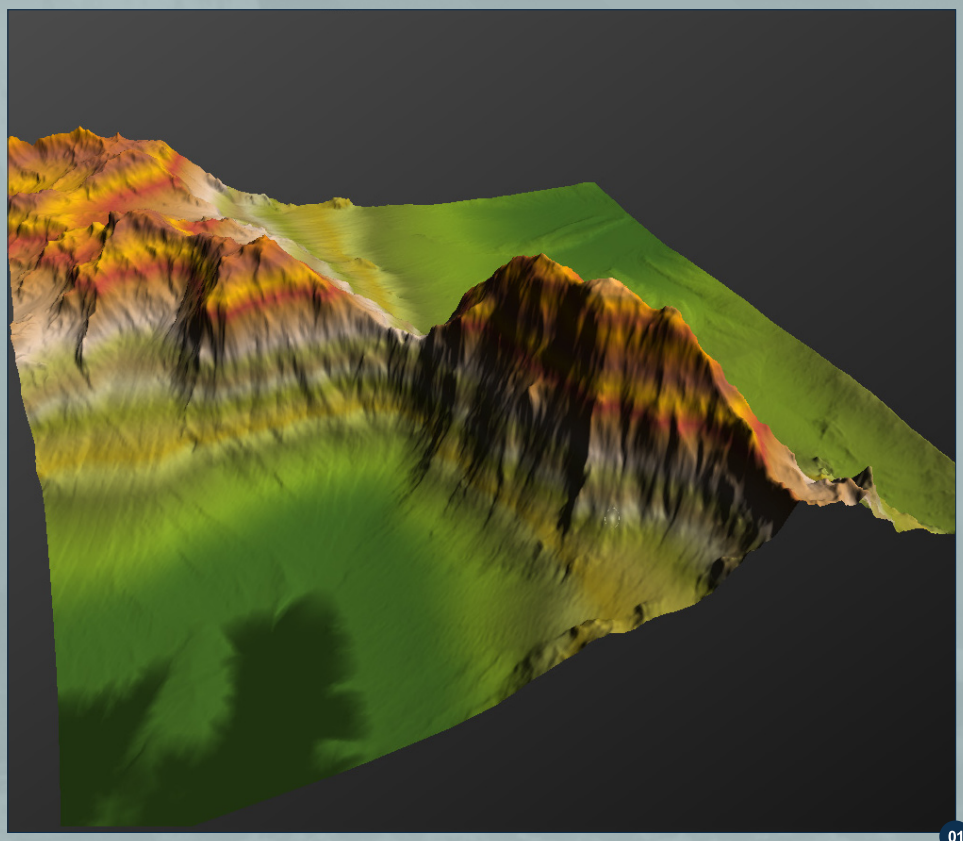
INTRODUCTION

In the fourth part of the Vue tutorial series, I decided to go for a winter scene. The cold months are coming and a lot of people will be thinking of creating wintery scenes. This article will give you an idea about the way to approach such an environment, and how to get a beautiful result out of a mostly monochromatic situation. Because wintery scenes offer very little by way of color variation, I chose to create a scene set at a time of day when the sun is at a low point. This is to benefit from the contrast of the really cold shadows, and the powerful warm colors in the highlights.

This tutorial will not be an extremely technical one, but again, a great example of using fairly simple elements to create visually stunning results. I will focus on the important steps that make all the difference in the final image, pointing out the reasons behind the creative choices I make.

THE TERRAIN

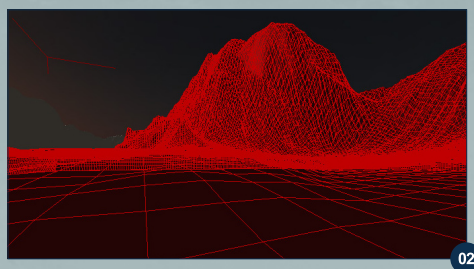
So the idea of this image is to create a beautiful large river valley in Winter. I am not planning to show the mountains close up, so I am not looking to create anything incredibly specific or highly detailed. I am concentrating however on the overall big shapes, because I would like a nice big cliff reflecting on the rivers surface. **Fig.01** shows the procedural terrain I will be using for the main cliff.



01

CHOOSING THE LAYOUT

In terms of layout I am thinking about working in landscape, showing the wide valley in all its beauty. Because it is a river shot I thought it would look cool if we could get really close to the water's surface, with the camera almost on the water (**Fig.02**).



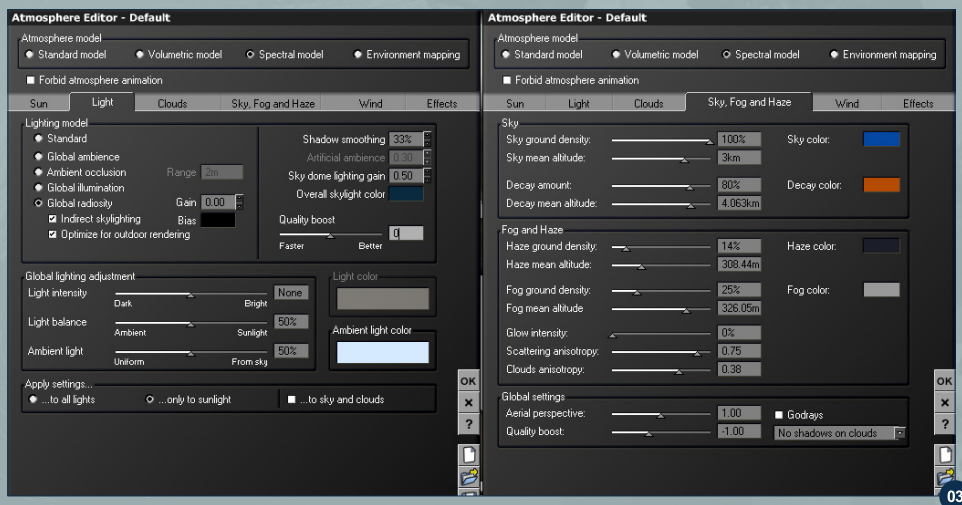
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At this point though I am not thinking about the river itself, I just need to find a good composition.

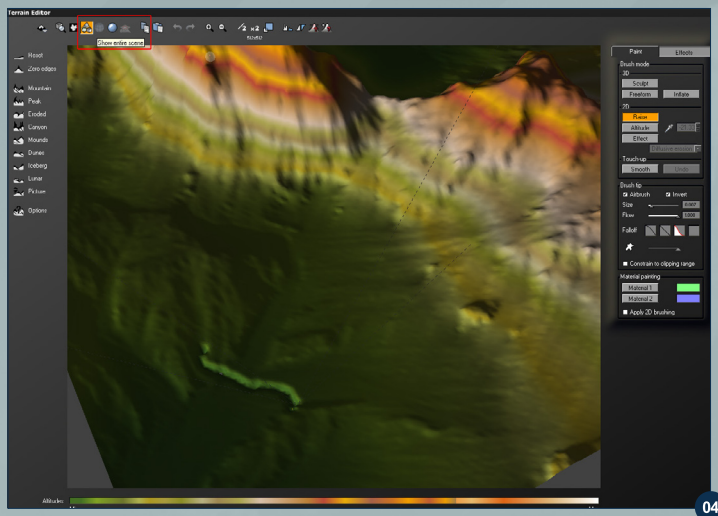
SETTING UP THE LIGHTING

As far as the lighting goes, as I said earlier the idea would be to try to combine some warm and cool colors, even if this is a winter scene. To achieve this I will lower the position of the sun until most of the scene is in shadow which means I get some nice highlights on the tall mountains.

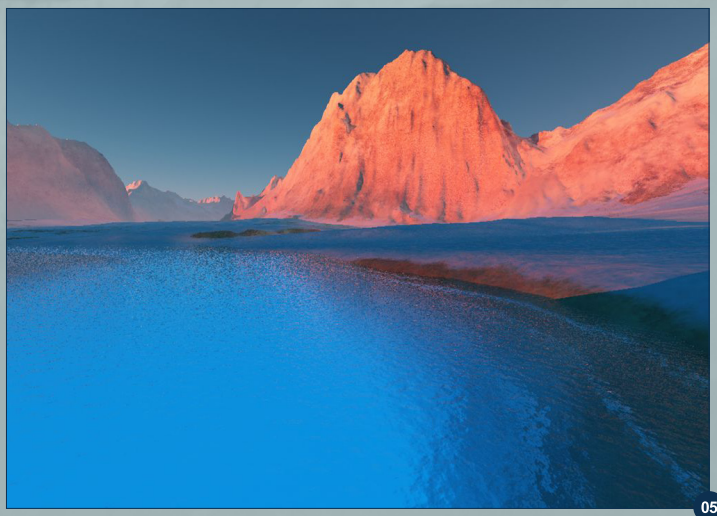
I will not be adding any clouds as I like the idea of a clear cold winter sky. In **Fig.03** you can see my atmosphere settings. Notice I am not using a lot of haze, because at this point I want a

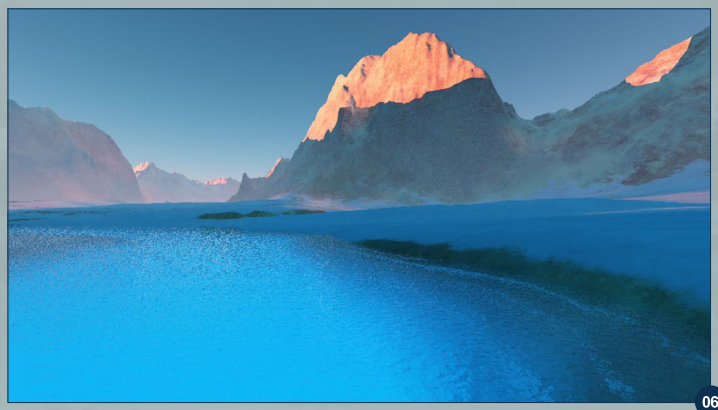


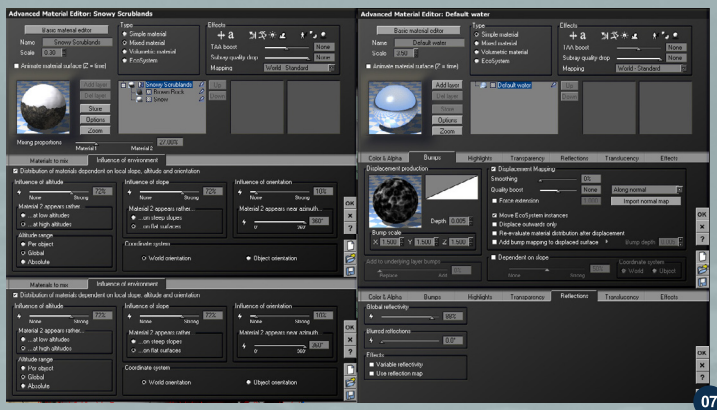
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crisp and clear feel to the atmosphere. At a later point I will be adding some light floating fog on the water's surface, and use the haze to create more depth in the image, but for the moment we will work with a clear atmosphere.

Creating the River

To create the river, I opened the terrain editor, and activated the show entire scene option. This way I can see the position of the camera on my terrain, and sculpt the river in without having to change my camera position or general layout (**Fig.04**).

After adding some basic materials to the terrain and water I come up with something that looks like **Fig.05**.

Adding Out of Frame Elements

Right now I have what I wanted, a big shadow area and highlights on the mountains. But the highlight area is way too big for what I had in mind, so I needed to do something about that. The solution is to add a mountain behind the camera, so it can cast a shadow on the mountains that are in frame. This is a very good example of additional elements outside the image frame, which do have a very important role in making the space read better and help convey an idea (**Fig.06**).

Building the Materials

The materials we used to set up the general layout served a purpose, but now I have to go in and tweak them to get closer to the image I had in my mind. In this case, the material for the river is more important than for the mountains, because it is much closer to the camera.

I want the river's surface to look frozen, so I will make it completely reflective. By using a noise function as a displacement map and tweaking the values I get what I want. For the mountains I am using a tweaked default material (**Fig.07**).

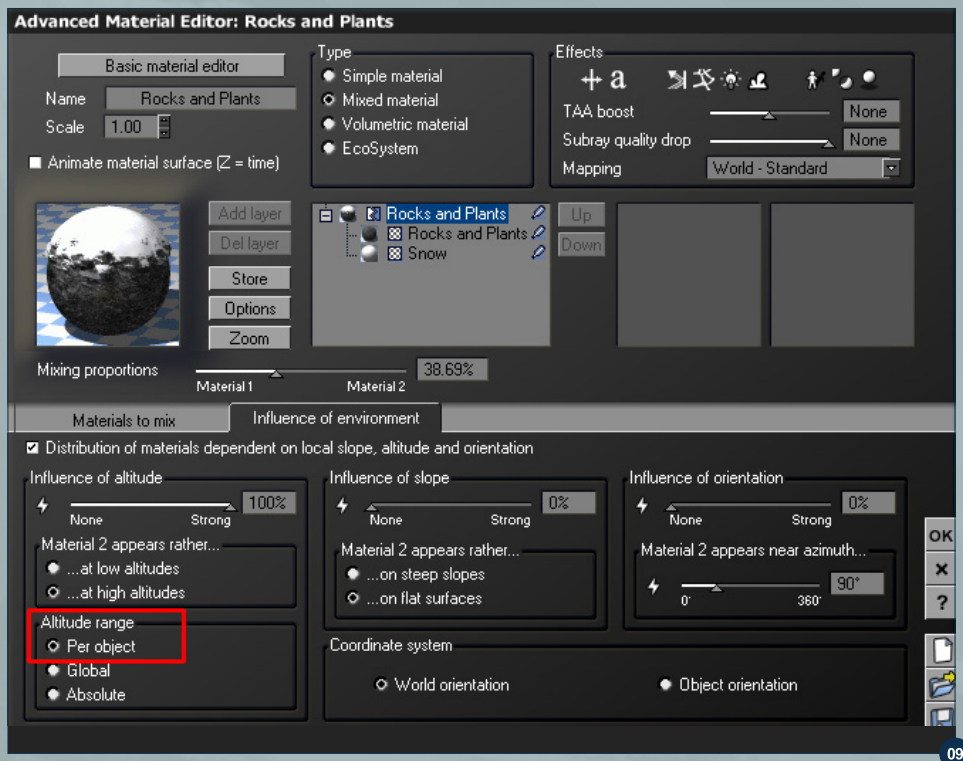
I separated the ground from the mountain by duplicating the terrain and keeping what I needed from each of the copies. I also refined the mountain layout which definitely helped improve the image as you will see in (**Fig.08**).

Adding the River Rocks

This is the perfect moment to work on the shore of the river, because it looks really bad. I will be adding a lot of rocks around, even in the foreground so it further sells the idea of a mountain river.


08

I am using a couple of default Vue rocks, which I copied and rotated lots of times until I was happy with the general layout. An interesting thing about the rocks is the material that I used. Even though they are very small objects, you can still use the material distribution to create nice effects. So I used a mixed material with altitude control to add snow on the top of the rocks. Given the fact that they are so close to the camera, it was a good idea to use displacements for the materials (**Fig.09**).



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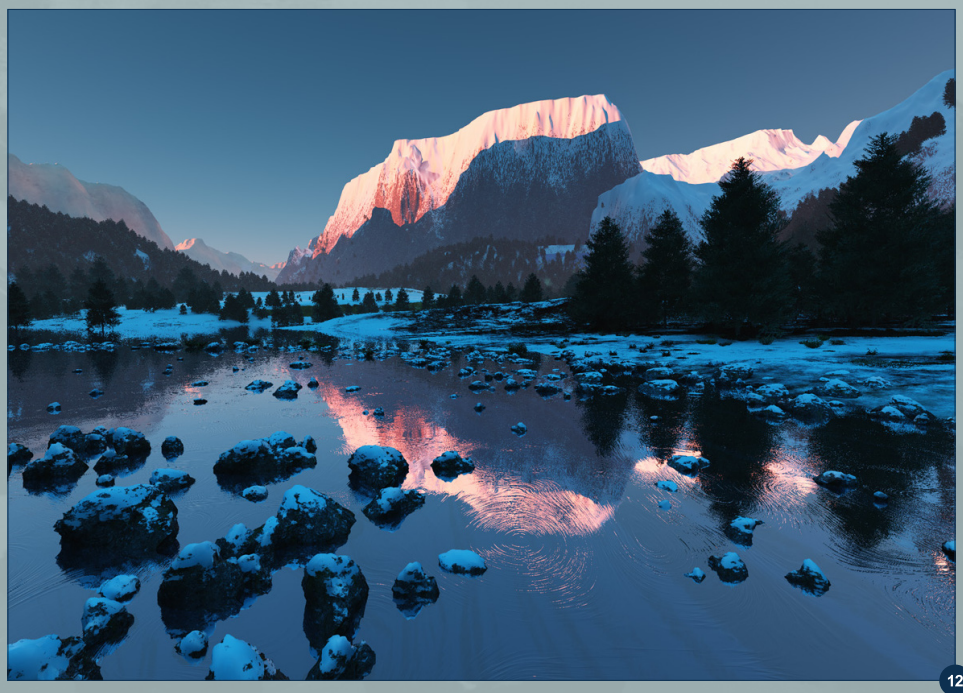
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Fig.10 shows how the scene looks now that we also added the rocks in the river. I think this is another really good step forward.

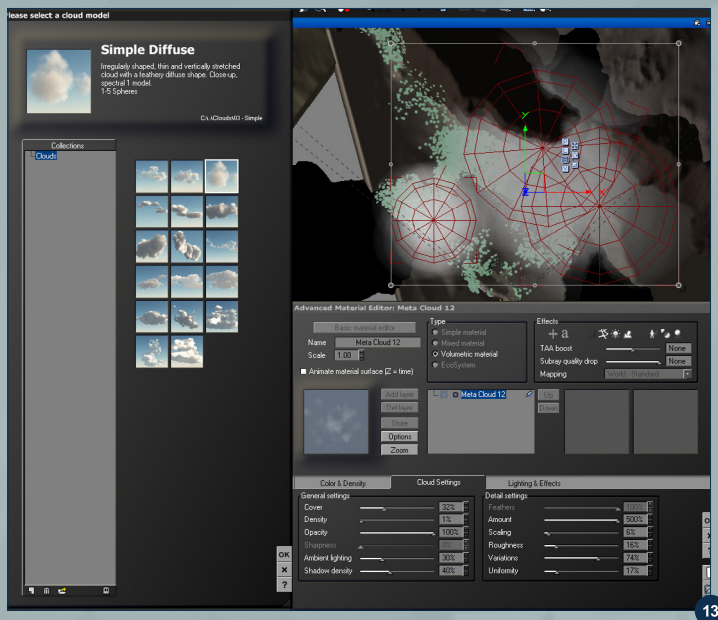
ADDING THE VEGETATION

For the vegetation, given the fact that I am creating a mountain valley, I will be using some evergreen trees as the main element. The tree of choice will be a Blue spruce this time. For the distribution I will use the ecosystem painter, because it allows me a lot more control on the layout of the vegetation. I spent quite a bit of time on this, adding other plants also, keeping in mind the scale I need to convey when adding each element. You can also use the scaling tool to try different plant sizes (**Fig.11**).

Fig.12 shows my image with all the vegetation elements added.



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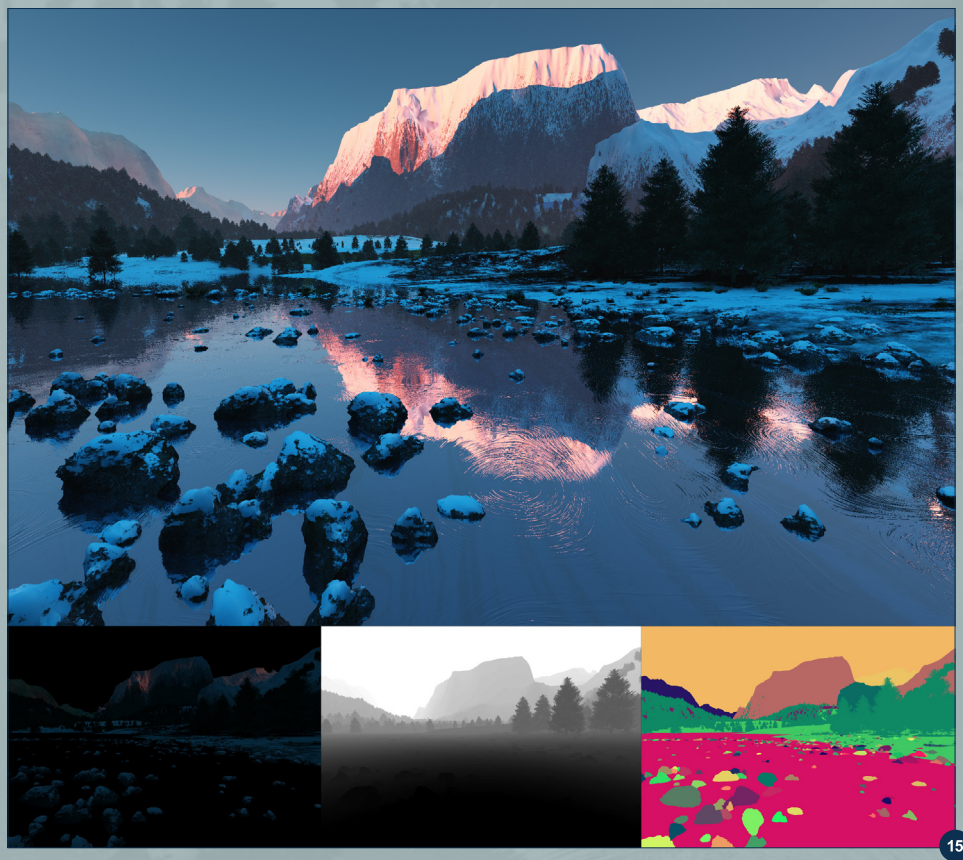
ADDING THE LOW CLOUDS

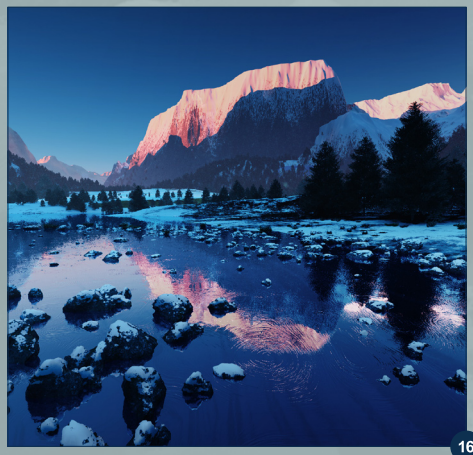
Because the image looks a bit too clean I will try to get in some more atmospheric effects, using some low altitude clouds. For this I will start with a default type of cloud, the Simple diffuse. I modified the settings to make it look less dense, then duplicated and rotated it around until I was kind of happy with the result (**Fig.13**).

In **Fig.14** you can see my render after adding the clouds.

RENDERING THE IMAGE

As I said in the previous tutorials, the final render from Vue is not the final step. We still need to do a more color corrections and atmospheric adjustments until we can call this done.


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Because I wasn't completely sure about the shapes of my low altitude clouds, I decided to render two versions, one with and one without so I can see what is needed.

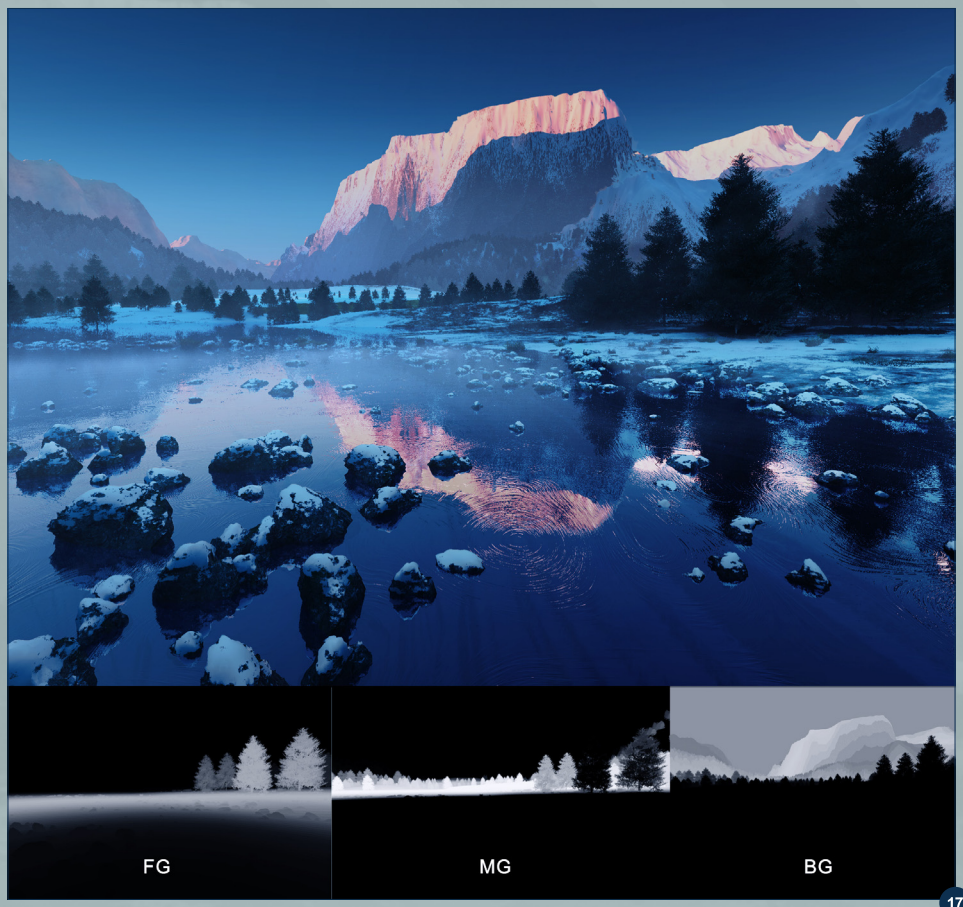
I activated the multipass render option and chose all the elements that might be useful, and hit the render button (**Fig.15**).

COLOR CORRECTIONS

The first thing I did after bringing the render into Photoshop was to use the masks to do some color corrections on the different elements. So I changed the water and the sky a bit, but most importantly the very bright values in the snow. I felt those were a bi to overexposed, so I toned them down and made them a bit warmer (**Fig.16**).

USING THE Z-DEPTH PASS FOR FOG LAYERING

You may have noticed by now that one of my favorite extra passes is Z-depth. There are so many way to use it, it's amazing. This time I select my canvas, copy the Z-depth pass into the clipboard (ctrl+c) and then paste it into a new channel. Then, by ctrl+clicking the newly created channel we get a selection that I will use as an alpha mask on a solid color. This will be my new fog. I will duplicate the solid a couple of times, and on each of them individually I will color correct the mask to isolate the influence area (foreground, middle-ground, background, etc). Here are some examples of alpha masks and the result on my image (**Fig.17**).



17

ADDING THE CLOUDS

I still wasn't very happy with the clouds so I went back to Vue to move my clouds around a bit. I then placed the render on top of my cloudless render, but underneath the color correction and depth fog layers, created an alpha mask and made it black. By painting with white in the mask I revealed the clouds only in a few places. **Fig.18** shows the image when I was happy with it.

THE FINISHING TOUCHES

The last thing I had to do was to add a bit of lens blur to the background, a bit of chromatic aberration and some grain. I thought that adding the moon to the sky would make an interesting element. Then I cropped to a wider format and saved an image I was happy with (**Fig.19**).
I couldn't stop wondering how it would look if the image were less exposed. So I deactivated the Automatic exposure and Natural film exposure in the Post Processing options of Vue, and used that as the base in my Photoshop file. The result was more than satisfying, because it was more moody and mysterious (**Fig.20**).


18

This concludes the last tutorial of the series. I hope you enjoyed them because I have tried to choose original and interesting subjects, which would push the reader's Vue skills both on a technical and artistic level. If there is one thing that people should remember from these tutorials it is to know how to split the work between Vue and post processing. Efficiency is one of the most important aspects of production and when working with large scale environments, knowing how to get the best with as little effort is crucial. Thank you very much for your time, and have fun in Vue!



Alex Popescu

For more from this artist visit:

http://www.alexpopescu.net/

Or contact him at:

alex@alexpopescu.net



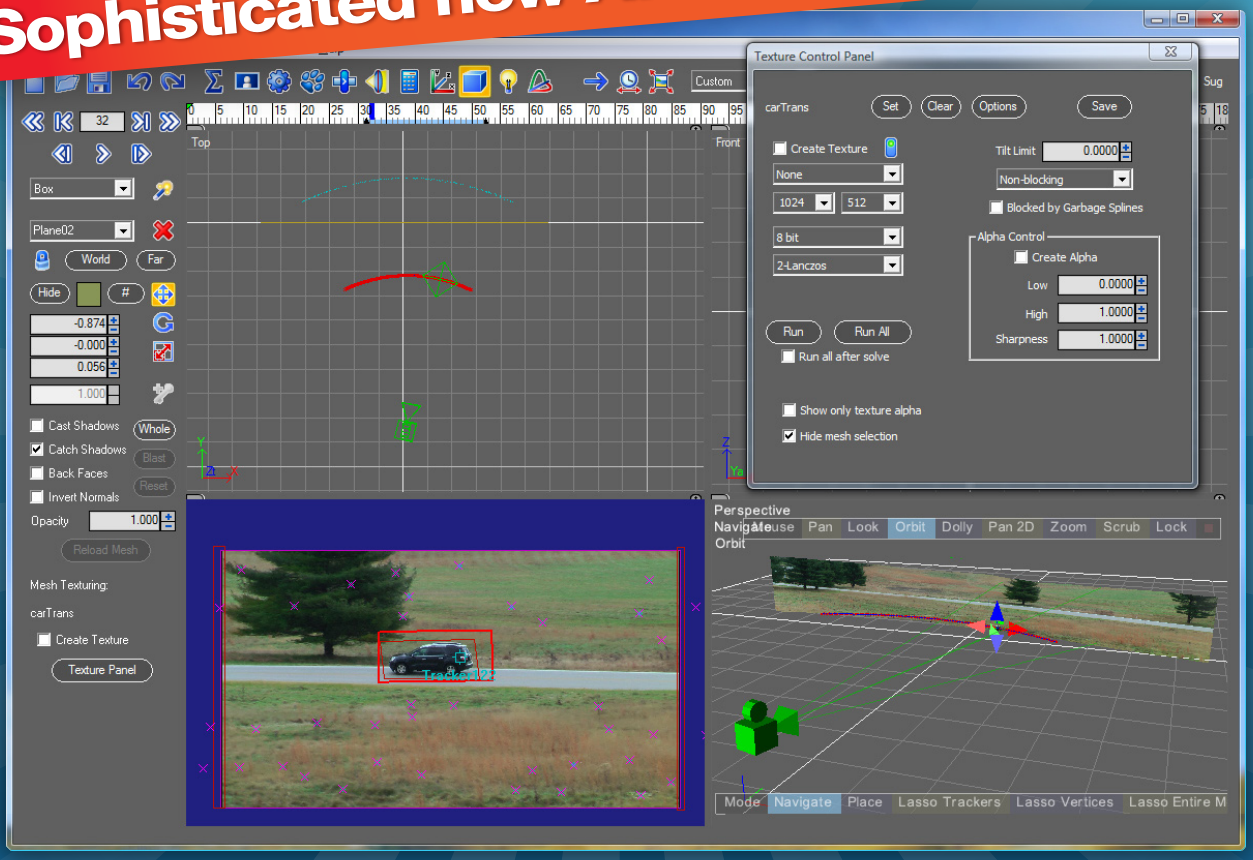




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Sometimes you come across a building that has a creative impact on you. This was certainly the case for Jacinto Monteiro. He was so impressed with the architecture university that he studied at that he felt compelled to model it in a photorealistic way, and in this month's Making Of he tells us how he did it.

FAUP - PATH TO KNOWLEDGE

Software used: 3DMax and V- Ray

INSPIRATION

This personal work was created specifically for the Evermotion competition 2011. The digital artist could choose any interior space that inspired him. The main aim was for it to be photoreal.

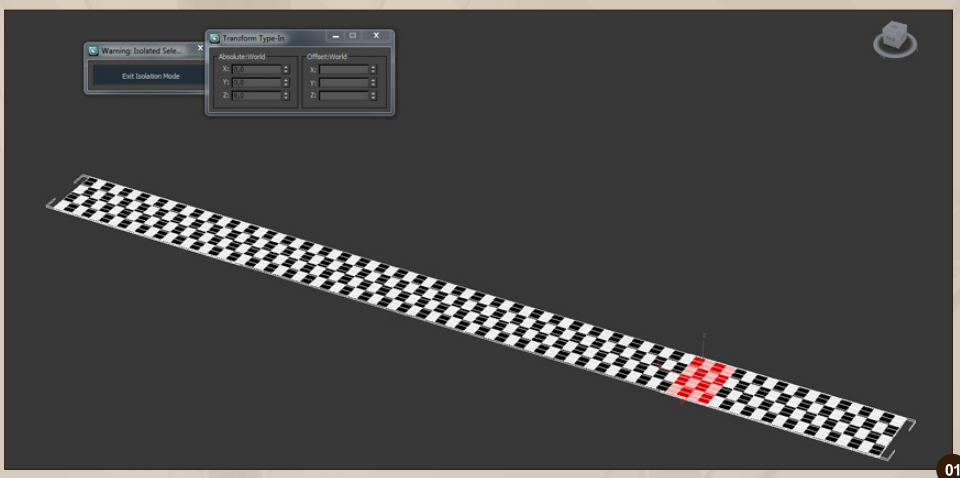
I chose the architecture university where I've been studying for six years. For a long time I wanted to create the path that goes from the street to the end of the building complex, which is the library itself. Because of time constraints I couldn't model everything so I focused on a short part of that same path.

Inspired by Michelangelo, the original architect Siza created a difficult path that leads you up ramps, down stairs and through almost labyrinth-like routes until you reach the end of the complex: the library. It is, in my opinion, the perfect place to read, mainly because the shadow is so soft and doesn't interfere with your reading. There is great geometry, fine details and a remarkable sense of scale in this space.

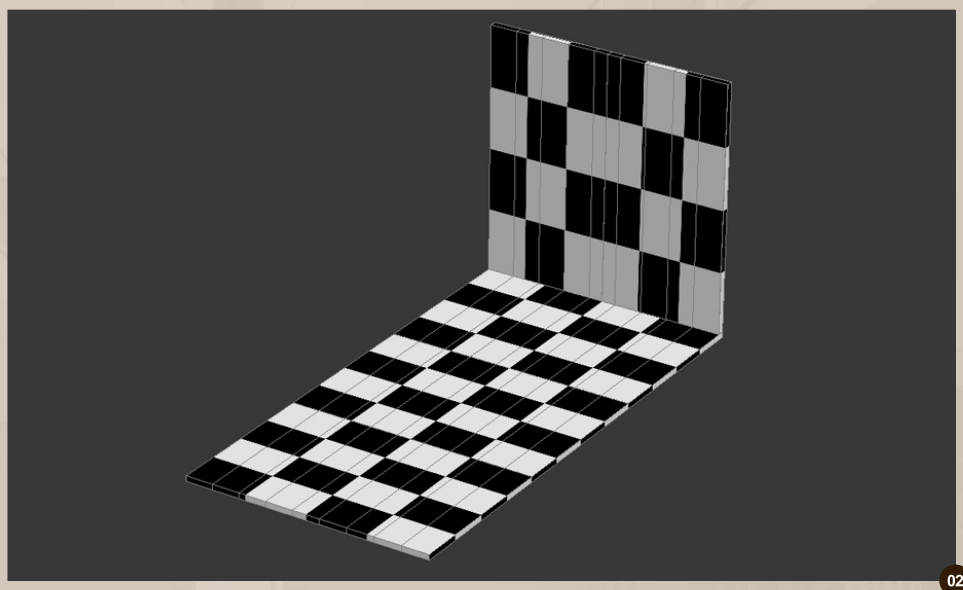
The goal of my work was to respect Siza´s architectural concept, simplicity, materials, light and design, and obviously make it look hyper-realistic.

MODELING

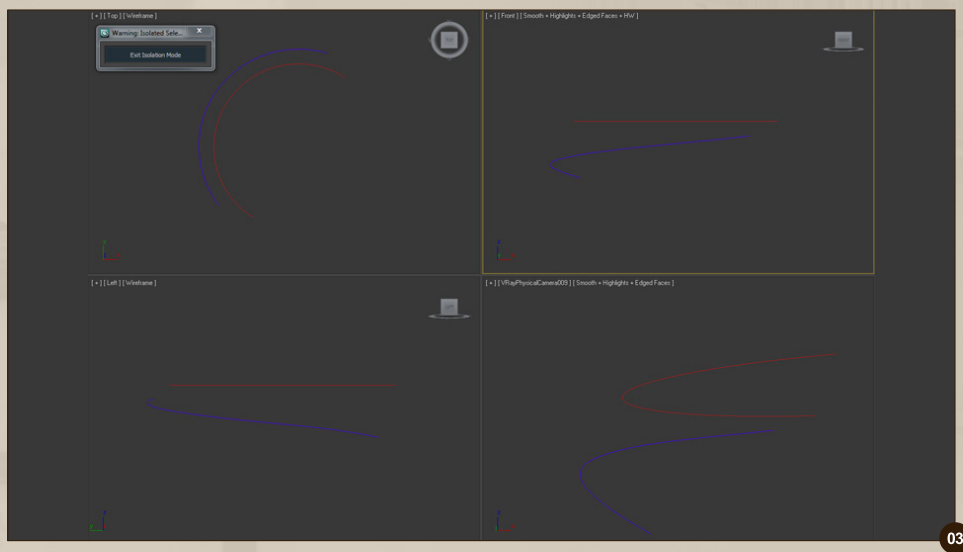
This part of the article covers the modeling of the museum space. For the floor, ramp and near wall I modeled simple boxes with the desired dimensions, around 1m x 50cm (**Fig.01 – 02**). Although it seems like the floor is one big object it is not. It's composed of different pieces (elements) separated by 5mm. This is very important because at the end of all this modeling I wanted to give each element a different ID – using the Unique Material plugin. Once the basic model was done, I applied a checker material with 2,0 tiling in order to know how well it was distributed after using the RailClone Pro plugin. In the end, I changed the checker material to a marble, which you will see in the texturing section.



01

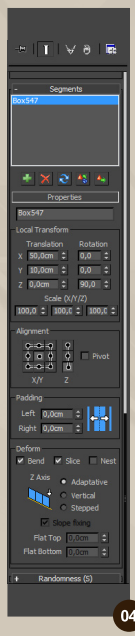


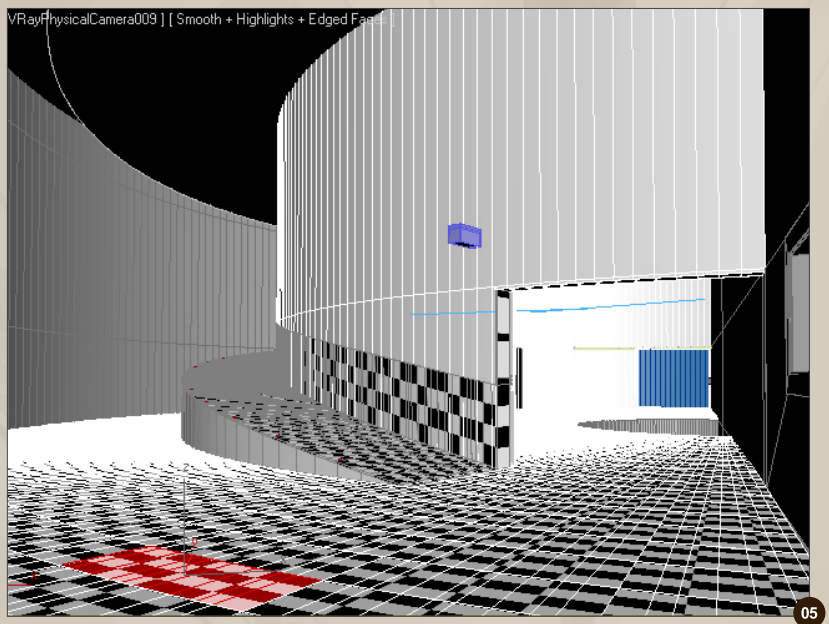
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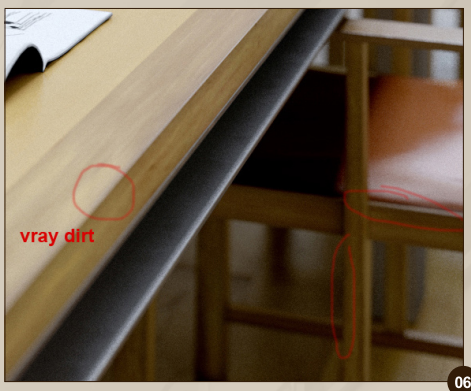
03

I then created two splines, one for the floor and the other for the ramp. This determines their path when using the RailClone Pro plugin (**Fig.03**).


04



05



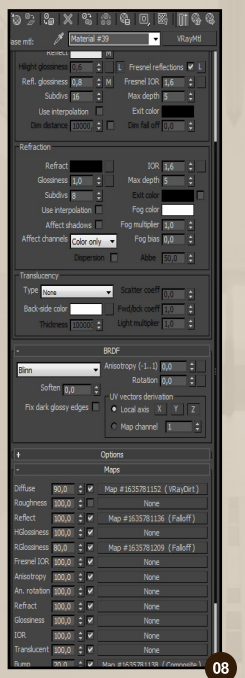
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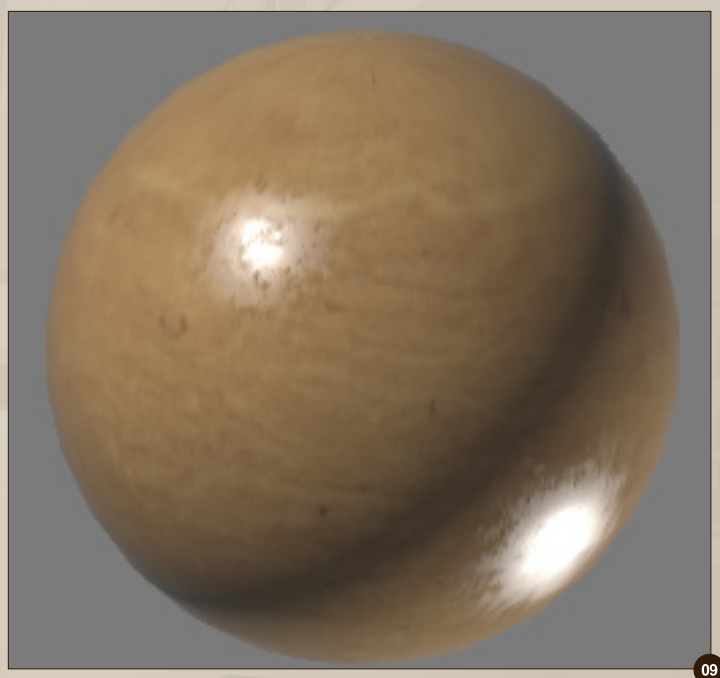


07

This is the final model after tweaking the parameters a bit in the RailClone settings. Everything else was set as default (**Fig.04 – 05**).

After I had done this I converted the Railclone geometry into an editable poly object. Then, using the Unique Material ID free plugin, I gave the floor and ramp objects different IDs automatically. Each marble unit (element) had a different ID now. This made the marble material (multi-texture plugin) work perfectly once it was applied to the poly object.

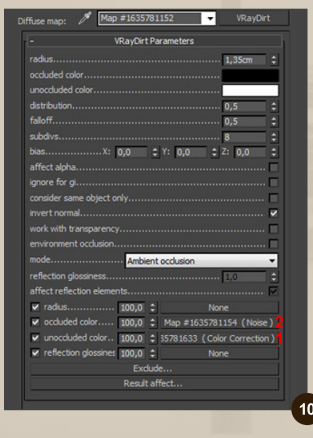

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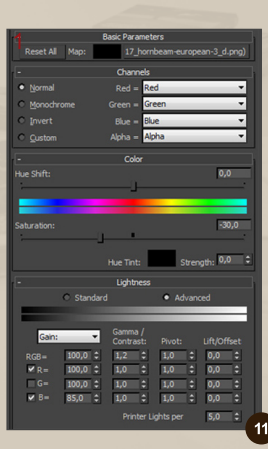

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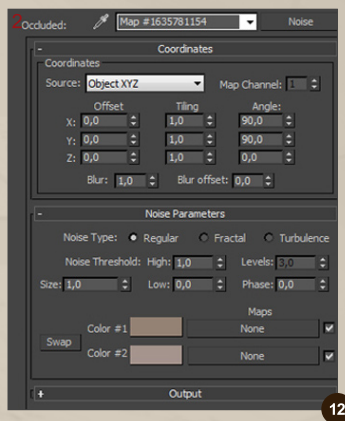
Texturing

Next I want to talk about the V-Ray dirt present on the edge of most of the wood materials. I will focus on the darker wood. Take a look at the detailing in **Fig.06 – 07**. As you can see, over the diffuse map there is a darker, thin edge with a few subtle differences on it. That is generated by V-Ray dirt with noise inside the diffuse channel. It's a little detail that can make the difference, especially in close-ups.

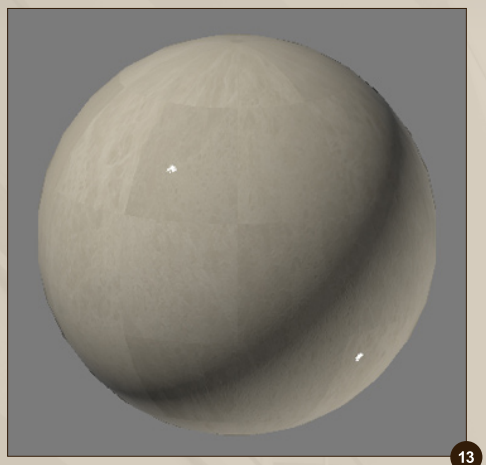
Fig.08 – 09 show the general settings for the wood material.


10


11


12

You will notice that the V-Ray dirt in the diffuse channel has a small radius, so that it does not go too far over the real wood diffuse. Also by ticking Invert Normal the parameter will change the direction of the raytracing. When it is off the rays are traced outside the surface; when on they are traced inside the surface. Basically it means that the dirt areas will appear on all the edges (if bias X, Y and Z are set to zero) (**Fig.10 – 12**).



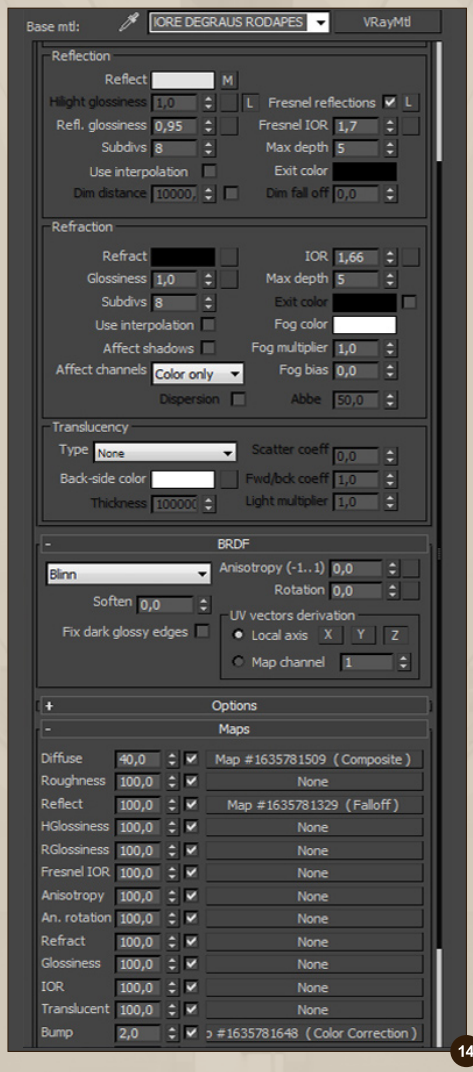
The un-occluded color is a normal diffuse map. In my work I always use color corrections and trigger the advanced settings, changing Gamma, Red, Green and Blue values and removing a bit of the saturation (in this case -30). It's never the same twice, as the material or scene is always different. I do all sorts of tests until all the materials blend together properly.

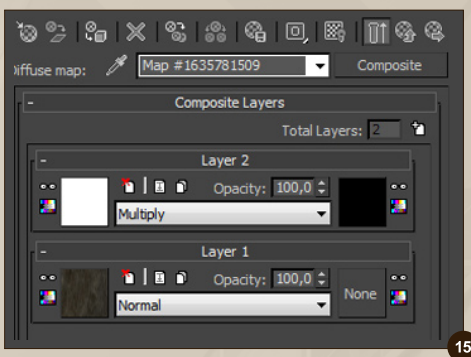
The noise inserted in the occluded color slot will make the edge behave in a random way. In this case, it was important to choose the colors inside the noise wisely so that they would blend well with the un-occluded color (diffuse map). This was so the edge didn't look too dark or too similar to the wood itself.

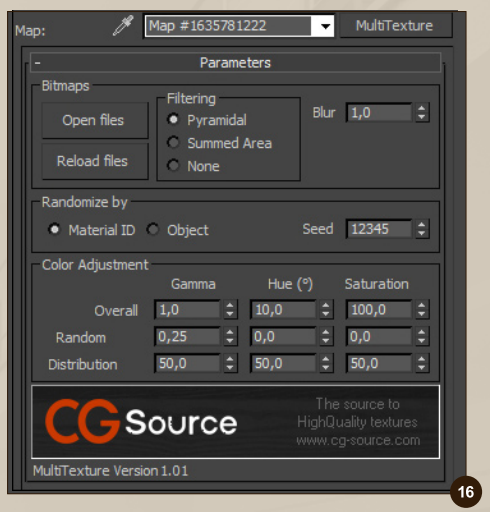
In some photos of the subject building I noticed that the marble on the floor had gained a slight green tint, probably due to humidity of some sort. I took that into account when texturing the floor. In **Fig.13** you can see I used the famous multi-texture plugin in a subtle way.

Fig.14 shows the general settings of the V-Ray material. They are nothing too fancy. The diffuse channel is a composite with two types of map. Layer 1 is the aforementioned multi-texture, and layer 2 is the dirt map set to Multiply. The dirt map was painted in Photoshop (**Fig.15**).

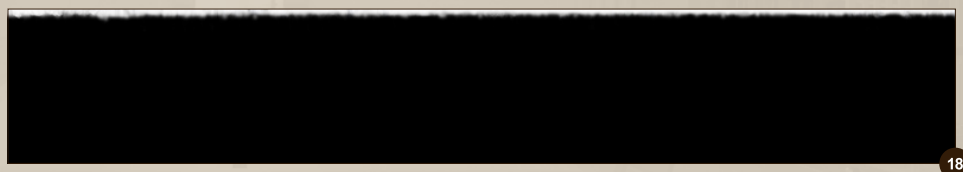
Fig.16 shows the multi-texture settings that make up the first layer. I used about eight types of different marble maps for this multi-texture, which I acquired at CGSource.com.

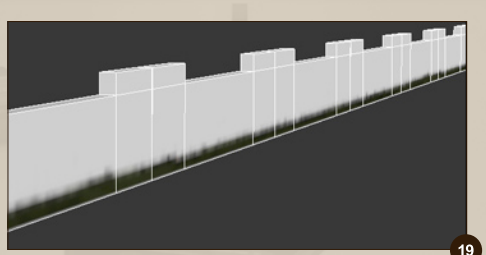


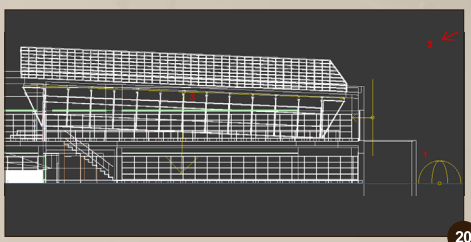












Layer 2 was the composite maps, the dirt map and its mask. I used the same map, but rotated it 90 degrees to add more dirt (**Fig.17 – 19**).

LIGHT

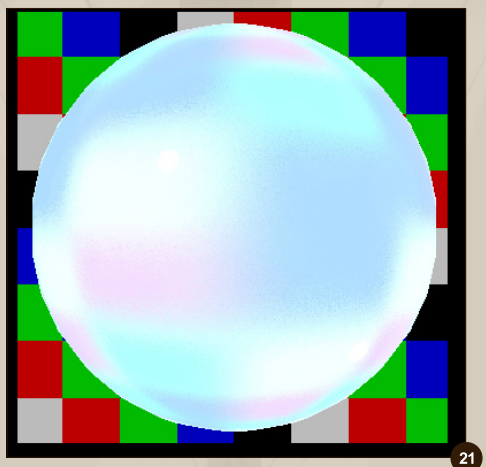
The light system used was basically an HDRI inside a V-Ray Light Dome and a V-Ray Sun. The big difference here (or perhaps the little secret) is the skylight glass and what happens inside the structure. At first, I wanted to have only a V-Ray light dome, but the result didn't look very realistic. So I decided to boost the light inside the skylight and treat the glass as if it were being hit by bounces of light that would eventually pass to the interior.

Fig.20 – 21 show the lights and how and where they were placed. There is a V-Ray light with a

skylight portal in one of the windows, but it had zero effect on the scene and was just there for testing purposes; it isn't used in the final scene. A V-Ray light with an intensity of 10,0 was set to Visible and placed inside the skylight.

I wanted the frost glass to have a glossy look and at the same time a nice refraction so that it would be possible to see the metal structure inside of the skylight. The glass was made using a V-Ray blend material, which was a glossy glass combined with a V-Ray light material. It was set to an intensity of 100, the color was RBG (57, 95, 153) and the blend amount was a gray value equal to 5 (**Fig.21 – 22**).

Here are the frosted glass settings (**Fig.23**).



21



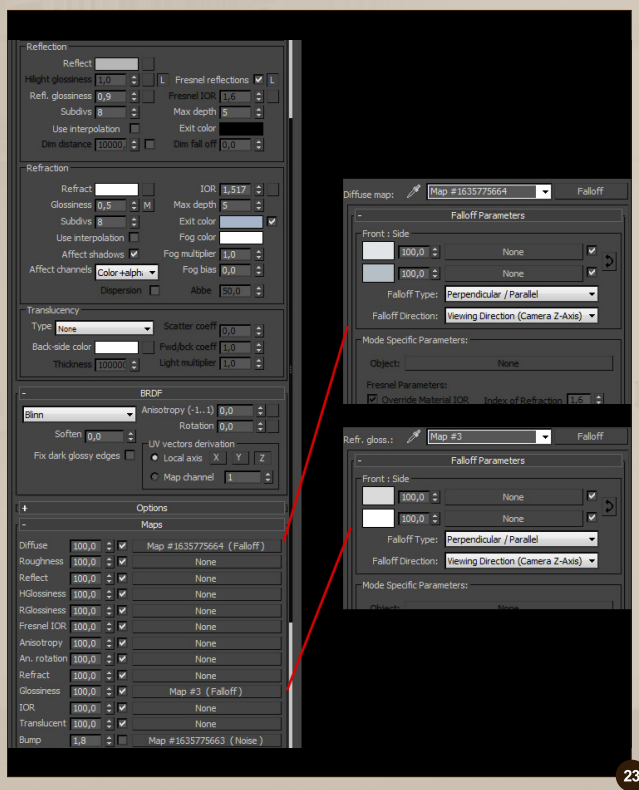
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Rendering

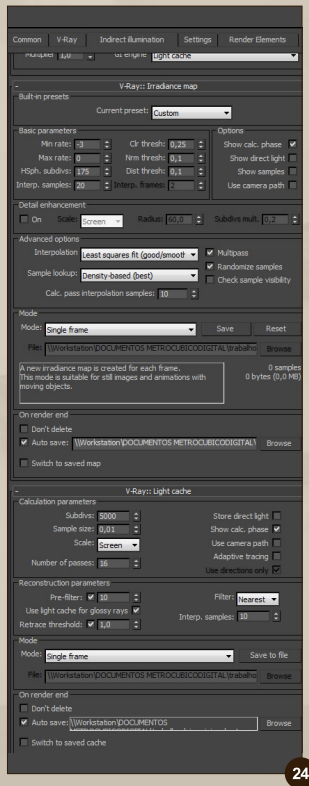
During the testing period I used universal settings, but I decided that I wanted to create an image over 3500 pixels high so universal settings were no longer an option. For the final images I used an irradiance map and light cache. I won't explain much about the settings except that I rendered the first images at a smaller resolution (four times lower that the final output; in my case it would be 875 x 619 pixels) and saved the irradiance map pre-passes (*.vrmap) plus the light cache map (*.vrlmap) to use afterwards for the final image. By using these maps you can skip the irradiance and light cache process and go straight to the render itself.

Take a look at the GI settings in **Fig.24**, which are the ones I used for the 875 x 619 render. In the irradiance map settings I set the Min and Max rate to -3 and 0 respectively. That meant a high quality irradiance map. If I had tried to render the final image with these settings it would have been impossible, but since I was rendering at a lower resolution I just saved the irradiance and light cache maps as it wouldn't take much longer to render than 1 hour on an 8 core computer. After the irradiance and light cache maps were calculated and saved I went back to the render settings and set the resolution to 3500 x 2625 pixels. Also, in the Mode section of the irradiance map settings, I changed Single Frame to a *.vrmap file and saved it. I also did that for the light cache file. For a good explanation of this process, check out the V-Ray Complete Guide written by Franscesco Legrenzi.

Fig.25 shows the V-Ray render and color mapping settings.



23



24

Post-production

Everything was done in Photoshop except the last part where I used After Effects Magic Bullet Misfire Vignette. You can see this in the free video you can download with this tutorial.

Jacinto Monteiro

For more from this artist visit:
http://www.metrocubicodigital.com/
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ANDO

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This month we feature:

"Classroom"

by Meny Hilsenrad



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The following shots of the “Classroom” book pages are featured here in full-resolution and can be read by zooming in...



Classroom

By Meny Hilsenrad – Studio Aiko

Job Title: Creative Director, 3D Artist and Co-founder of Studio Aiko

Software Used: 3ds Max, V-Ray, Photoshop and After Effects



Introduction

During this project, I focused my attention on certain aspects more than others. In order of priority these were: the modeling, textures and shaders, followed by the four different light setups and finally the post-production. Throughout this article I will explain and demonstrate my workflow, which may help you to better understand the creative process behind the scene.

> “The biggest challenge concerning the modeling process was creating and dealing with the amount of detail apparent within the scene”

An important issue that needs to be mentioned before proceeding is that a lot of research is necessary before beginning anything in 3D. Almost every object was created after long hours of observing photos I found on the web or took myself. This research continued throughout the entire process and I believe it couldn't have been done otherwise.





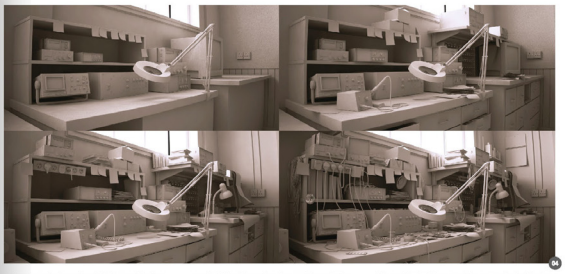
Modeling

The biggest challenge concerning the modeling process was creating and dealing with the amount of detail apparent within the scene. My goal was to create an impressive amount of detail, which would help create the realism I was aiming for. The first step was to create the basic composition while focusing on only one camera position that encompassed the entire classroom. I created basic blocks representing the main objects, which I would later add more detail to (walls, chairs, desks, blackboards etc..) and arranged them in space while adjusting the camera angle (**Fig.01**).



After I had a better understanding of the scene, I then started getting deeper and deeper into the detail on the chairs, desks, floor, and projector – essentially the objects that had the most presence in the composition (**Fig.02**).

The further I progressed with the modeling, the more I got into the details such as the books and pages etc. I was careful to maintain the original camera position and avoided testing other viewpoints as I wanted to avoid being distracted from the original idea behind the project (**Fig.03**).



Whilst nearing the end of the general compositional work, I started to focus on the desk area where I wanted to place a lot of emphasis. The modeling method was similar to the previous approach; I started with the most significant objects in the composition (the nearest electronic devices, magnifying glass, drawers etc..) and then moved to the surrounding areas. Slowly I increased detail by first refining the electronic devices and then eventually moved onto the surrounding area (electronic wires, circuits parts, screwdrivers, paper/books etc..) and all the small pieces that merged everything together. This process took a lot of time and was quite frustrating initially, but it became worthwhile as I started to see some results (**Fig.04**).

Texturing and Shaders

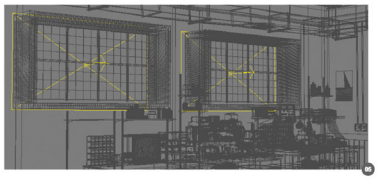
After completing the modeling phase (more or less), I moved onto the textures and shaders. All in all this phase was very long and difficult, but the research helped a lot. As before, I started on the objects that commanded the most presence, such as the walls, floor, and blackboard. Then I moved to the smaller but no less crucial objects, such as the chairs, desks and projector. Many of the textures have been created from scratch in Photoshop, but I also used photos I found on the web (mostly for the books and magazine covers, papers, and sticker). They were modified in Photoshop to add dirt and blended with other layers.

The next stage was to texture the electronic devices and objects on the desk. There weren't any shortcuts here and the task was extensive, incorporating numerous reference photos of old electronic appliances, which were then used to create the textures from scratch.

The scene was rendered using the V-Ray engine and V-Ray's shaders. Because of the complexity of the scene and amount of detail, my first thought was to keep the shaders as simple as possible otherwise the test renders could be endless. Besides areas here and there I mainly used the basic shader parameters, experimenting with the Fresnel reflections and the amount of reflection glossing along with a little displacement. I let the textures do the work and only on specific objects, like the blackboard, chairs, and desks, did I use more complex shaders incorporating Specular and Glossiness maps etc.

Lighting

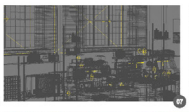
Initially whilst planning this scene, I didn't conceive the four different light setups I eventually developed, but as the scene progressed I saw the potential and wanted to take advantage of it. I started with the originally intended lighting setup, which was the “daylight” version. I used two V-Ray lights and placed them in the window openings. I used this method instead of sunlight because I wanted to get a soft kind of look devoid of any harsh contrast (**Fig.05**).

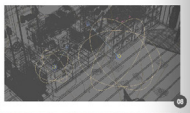


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The following shots of the “Classroom” book pages are featured here in full-resolution and can be read by zooming in...







The second light setup was the “sunny day”, set around morning and early noon. For this I used a V-Ray sun and adjusted it in conjunction with the V-Ray physical camera parameters until I got it right. If you compare this setup to the previous one the difference is obvious, however both occur during the daytime. In this mood the contrast is higher with a more pronounced range between the lights and darks and the sun’s rays now suggest a sunny day (**Fig.06**).



SUNNY DAY

The third lighting setup was the “night-time” version. I wanted to try a different approach and show the room in a completely different mood: a dark room lit mostly by artificial lights together with a subtle bluish light emanating from the exterior. Once again, V-Ray lights were placed in the windows and their job was to bring a subtle bluish light into the room, imitating the nocturnal light. Now that the scene was illuminated purely from the weak bluish light, it was a good time to position the artificial lights: the fluorescent light, desk lamp and the appliance lights, which create a yellowish contrast to the blue (**Fig.07**).



NIGHT TIME

The fourth and final light setup represents the “camera flash”. The idea for this came up whilst I was doing some render tests for the “night-time” setup. The trick was to use only one Omni light that aligned to each camera and was slightly offset on the top. This was done to imitate the way camera flash works. An important task lay in adjusting the attenuation of each Omni in order to illuminate the scene more in the foreground and make it diminish gradually towards the background. This required lots of render tests before it looked satisfactory (**Fig.08**).



CAMERA FLASH

Post-production

The post-production in this project was very important and is what gave the final images that all important touch (**Fig.09**). It was done



1: ORIGINAL RENDER FROM 3DS MAX

with After Effects because I find it easier to use, not only when working with stills but also for animation sequences. The reason for this is the control it affords, such as turning effects on and off when working with filters and being able to adjust them for each new render without repeating them each time.

I started on the camera’s Depth of Field, which was done by utilizing a Z-Depth pass rendered in 3ds Max (**Fig.10**). Faking the depth of field and not rendering it in Max not only helped me to tremendously decrease the render time, but it also allowed me to control and adjust the



2: CAMERA DEPTH OF FIELD ADDED AS POST EFFECT BY USING Z-DEPTH RENDER PASS



3: ADDING THE “DUST TEXTURE” LAYER AND THE “OUT-OF-FOCUS PARTICLES” EFFECT

amount of focus in real-time. This proved to be a huge advantage and looking at the final result it is almost impossible to see the difference.

The out-of-focus dust particles were created as a post effect as well (**Fig.11**). I used a particle system of simple spheres that filled the entire 3D scene, which were then rendered before applying the Out of Focus filter in After Effects to achieve the effect of dust particles being out of focus because of the close proximity to the camera. I also added a dust and noise texture and composited it on top of everything to blend with the blurred dust particles.

For the final touch I applied some color corrections (**Fig.12**). I adjusted the Levels to achieve a good contrast and also used Color Balance. I then added some colored layers to wash the entire frame and to blend everything together (**Fig.13**).

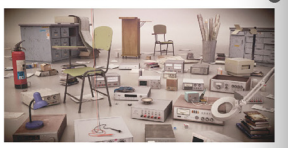


4: THE COLOR CORRECTION WORK (LEVELS, COLOR BALANCE ETC.)



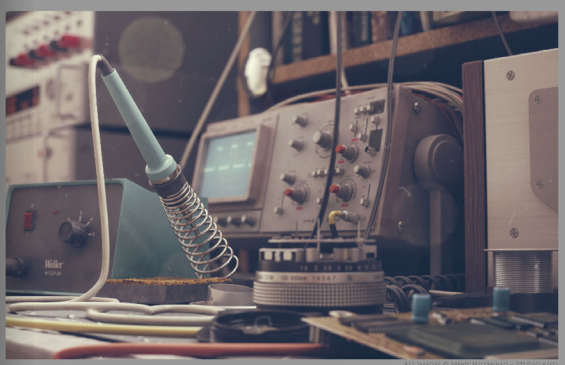
5: FINAL COLORED LAYERS WASH





Artist Portfolio





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:Volume 6



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SWORD MASTER 2

3ds max

Chapter 2 - Sculpting

In 2006 3DTotal created some groundbreaking training that quickly made a name for itself as one of the best 3D training resources available; that series was called the Swordmaster! Well five years later the Swordmaster is back and better than ever. In this series industry professional Gavin Goulden will be talking you through how to take a concept and turn it into a top quality character ready for use in a game. From basic modeling through to sculpting and texturing, Gavin will cover every step in great detail so that even an inexperienced 3D artist will be able to comfortably follow this series.



Chapter 1 | October Issue 074
Base model

Chapter 2 | This Issue
Sculpting

Chapter 3 | Next Issue
Low Poly Model

Chapter 4 | January Issue 077
Unwrapping

Chapter 5 | February Issue 078
Texturing

Chapter 6 | March Issue 079
Rendering

CHAPTER 2 - SCULPTING

Software used: 3ds Max

INTRODUCTION

In this portion of the series we are going to dive into the detailing phase of our model. We'll be creating a sketch sculpt in ZBrush, hard surface modeling, detailing in ZBrush, organic sculpting and even covering the creation of our character's accessories: his trusty sword and gun.

With our model exported from Max as an OBJ, we can simply import it into ZBrush by navigating to Tool > Import and selecting the face base mesh. You can also use Subtool Master, as I will later on, to import a massive amount of models all at once (**Fig.01**).

Fig 01

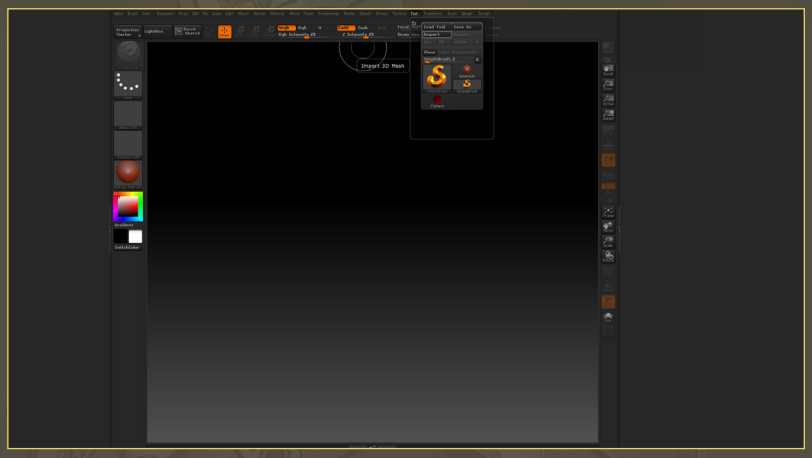
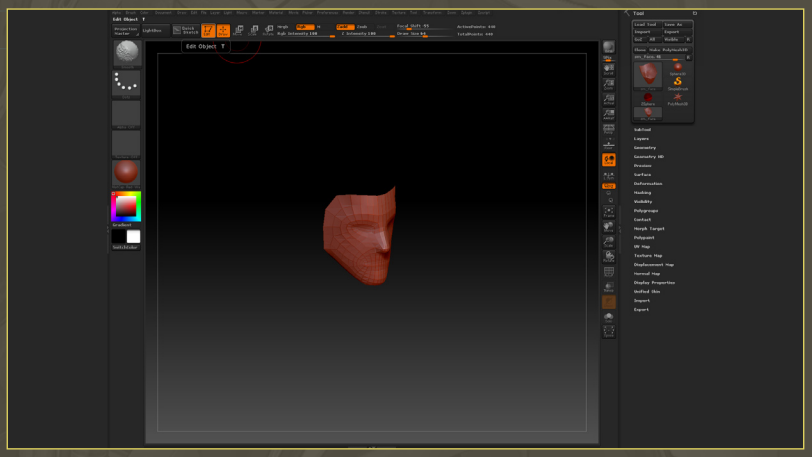


Fig 02



Once the model is imported into ZBrush, it won't actually be drawn in 3D space. You will need to click and drag the model on to the canvas and then enable Edit. This allows you to alter the model further; otherwise it will simply be a 2D image on a canvas.

I also have a few custom settings in my ZBrush. I use the default layout, for the most part, and have a set of alphas and matcaps that I use on a regular basis, which are placed into ZBrush's start up folder. This is just to save me time from loading the same material every time. I also have the brushes I use set to hotkeys from 1-6. These can be set by opening the Brush panel, pressing Alt + Ctrl and clicking on a brush icon. For example, I have Standard set to 1, Flatten set to 2, Pinch set to 3, Claytubes set to 4, Move set to 5 and Stitch set to 6. Generally, any brush I use is set to Add, using Alt to activate the reverse option such as Subtract (**Fig.02**).

Fig 03



Fig 04



After dividing the mesh a few times by pressing Ctrl + D (you can also manually add divisions in the Tool menu) I begin roughing out the facial features using the Claytubes brush. I generally sculpt in symmetry by pressing X. If you navigate to Transform you'll be able to set

the axis, or enable multiple axes, to be affected by symmetry. By default this is set to X. At this stage I'm not concerned about details; the goal here is to block in low frequency form information that can be read from far away (**Fig.03**).

Next I bring in a set of eyeballs to help keep that area crisp. This is simply two spheres that are mirrored on the X axis. Bring them in by first appending a dummy tool in the Subtool panel, then manually importing the OBJ via the Tool menu. I like to keep these as separate models within ZBrush to keep the sharp line of the eyelids intact against the eyeball. As I'll be altering that area quite a bit it's nice to have the eyes just retain their shape. Plus, it acts as a nice guide for eyelid volume and shape.

Here I begin refining the shapes more by bringing in sharper details, like the lip edges, with a standard brush (**Fig.04**).

More refining of big shapes here with a standard brush. I tend to over-sculpt areas and tone them down during the polishing stages; this can specifically be seen in the eye and mouth corner areas. If you sculpt too much, you can easily smooth out the area by holding down Shift and brushing over the trouble area (**Fig.05**).

Define tighter details, but still keep it at a low frequency level and avoid going overboard with wrinkles and surface details. Then begin refining the eye area more and sharpen up the nasal folds (**Fig.06**).

The mouth is a touch too wide for the character's face. Generally the corners of the mouth line up with the pupil of the eye. So let's drop the subdivision levels to easily alter a larger space. This can be done by simply pressing Shift + D – do this and you'll see your model become lower resolution. With the Move brush selected (not the Move Transpose tool) bring the mouth width in (**Fig.07**).

Fig 05



Fig 06



Fig 07



Fig 08





Fig 09

Now move into higher frequency detail, nothing as fine as skin pores, but getting finer details like working the edge of the lips and the flesh of the cheeks (**Fig.08**).

I find it really helps to sell an organic piece, especially a human face, by contrasting hard edges against an otherwise soft object. For example, in this step I've flattened the cheekbones, the eyelids and the bridge of the nose by using the Flatten brush. This helps the details in the face to really pop out by avoiding having all of the features form one continuous "blob". Unless you're going for a very stylized look to your character, I would keep this sort of detail to areas that would have bones closer to the skin. Meaty areas, like the chin or nasal fold, may look odd if they are given a sharp treatment especially when deforming during animations as you will be stretching and squashing a surface that looks stiff (**Fig.09**).



Fig 10

Add sharper edges at a lower level at the tip of the nose and the edge of the lips. Here, also add slight surface variations with a standard brush at low intensity. This helps during lighting to show that the skin isn't a perfectly smooth surface. Adding slight depressions, like on the chin and forehead, also shows where skin can bunch up and compress without baking too much expression in a sculpt that's intended to be fairly neutral (**Fig.10**).

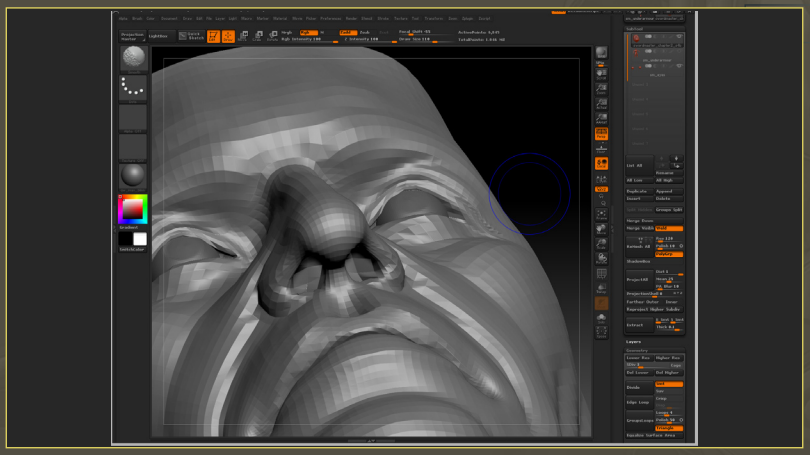


Fig 11

To help define the nostrils better, drop the subdivision levels down and move the tip of the nose inward to give the nose a natural flare. Also push the nostrils themselves in using a standard brush (**Fig.11**).



Fig 12

Now we finally get into the finer details of the skin. Try not to go overboard with this as it can make a character look older than intended and can make a normal map bake look muddy. There is only so much detail that can be translated in a normal map as it is all per pixel and dependent on your texture's resolution. Lots of pores and wrinkles can all blend together

during texture baking and cause the final output to look lower resolution than it actually is. So, for the most part I like to keep my models clean and isolate detail areas.

I have a few skin pore brushes that I use for character skin. This is made from a more or less black texture with white dots scattered about. Using the Claytubes brush at a very low intensity, paint a few strokes over the peak areas of the skin – like the cheekbones and highest area of the cheeks. Also lightly define the eyebrows with a standard brush, focusing on a few clumps of hair and being sure not to go overboard with the depth (**Fig.12**).

Next, add stubble by following the same steps just in Add mode and targeting the beard area. Again, be sure not to go overboard here as the end result can end up looking more like facial scaring rather than a five o'clock shadow. You can also add small details to help throw the symmetry of the face off, such as moles and bumps in the skin (**Fig.13**).

Here you can see the finer details I've added, such as a minor scars, blemishes and wrinkles from aging (**Fig.14**).

There is a detail in the mood concept painting for this character that I had originally thought was a battle scar. I thought this would be a cool touch for the character to show that he's fought before and lived to tell the tale. So, using a standard brush, let's cut into the skin and flatten the edges to make the cut not as sharp, to mimic skin healing in real life. Also add smaller scars coming off of this main cut to show where skin would have healed awkwardly (**Fig.15**).

Just like the eyeballs, import the underarmor base mesh as a subtool of the face sculpt. In the coming steps, we'll be sculpting out an armor design, practically sketching out the armor in 3D space. Once this is complete, we will build hard surface armor chunks around this sculpt only to bring them back into ZBrush for surface

Fig 13



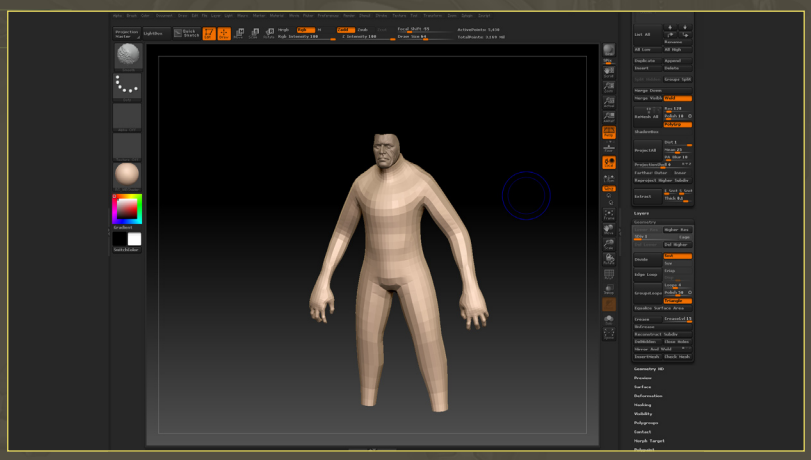
Fig 14



Fig 15



Fig 16



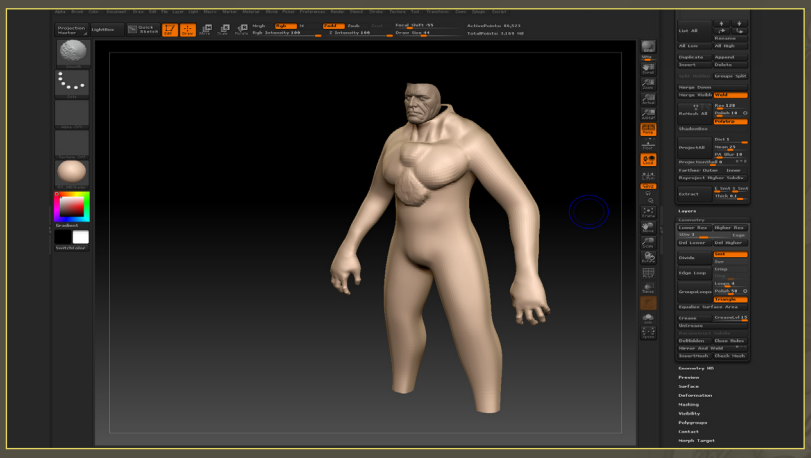


Fig 17



Fig 18



Fig 19



Fig 20

detailing. I find that this method provides a quick way to prototype ideas or work out complex shapes and is much more forgiving than traditional modeling techniques (**Fig.16**).

Much like the beginning stages of the face, start blocking in the chest armor pieces and the connecting armor chunks that guard the sternum and clavicle. The main priority is to just rough out the form of the armor plates indicated in the concept drawing. There is no reason to worry about how smooth the surfaces are as we will be crossing that bridge when we build the armor plates for real (**Fig.17**).

At this stage, I'm realizing that the arms are a touch too long, which can easily be fixed with the Transpose tool. First mask out the non-offending areas by holding down Ctrl, which activates the Masking tool, and paint over the body. Holding Ctrl and clicking on the model will blur the mask. At the top of the screen, clicking Move, Scale or Rotate will activate the Transpose tool.

In this case, I'm using a mixture of Move then Rotate. First, click the root of the deformation and then the effector, much like a bone for animations. After this has been set, move the area up by clicking the middle circle and dragging it up some. Do the same in Rotate mode to correct the orientation of the arm (**Fig.18**).

After this, begin blocking in the pelvis armor pieces with the Claytubes brush. I find marking out the two extremes of the torso helps visualize where the limits of the midsection will be (**Fig.19**).

Now start blocking in the midsection/rib plates as well as the muscle definition for the arms and hands. You can also run a flatten brush over some of the edges, especially around the pelvis, to get rid of the blobby look (**Fig.20**).

Now we're going to move onto blocking in the leg armor pieces, which, I think, is the most complicated section of the armor suit as there are many different "organic" metal shapes overlapping one another. I would suggest moving up a subdivision level at this point and flattening out broad edges with the Flatten tool, using a square alpha to give a chisel-type effect. This helps make armor layers pop out from one another, which is most noticeable in the upper leg armor and will help define boundaries when we crunch the sculpt down for later use (**Fig.21**).

Fig 21



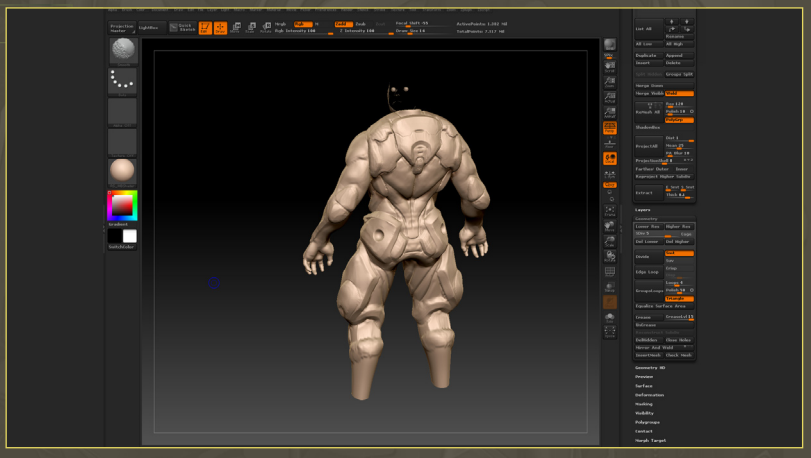
Refine the plates more, running over the separation areas with a standard brush and smoothing out trouble areas. Also quickly rough in areas like the arm plates, the abdominal muscles and armor plate details like bigger seams (**Fig.22**).

Fig 22



Now we want to carry this method over to the back panels of the character's armor suit. Focus on the main pieces, such as the center area and the overlapping shoulder blade pieces. You can rough in the back muscle details, but we will ultimately be tackling that in the final sculpt as one of the organic pieces like the arms and stomach. All of these pieces, like in the previous step, can simply be created by building up forms with the Claytubes brush, smoothing out trouble areas and flattening edges to give a sharper edge to the armor plates. Any surface detail at this point is basically just for visualization sake and will be tackled in the final sculpt (**Fig.23**).

Fig 23



Refine the shapes, deepening dividing lines between plates that will be built out in 3D as separate models and sharpening edges up for better compression. Like the back armor, any surface detail is just to help visualize what the final version will look like (**Fig.24**).

Fig 24



Next we are going to drop the overall polycount of the sculpt so that Max will be able to handle the model better. To do this, I recommend using the Decimation Master plugin provided by Pixologic. With the body model activated in the



Fig 25

subtool panel, navigate to Zplugin > Decimation Master. Here you will set the percentage that you would like to reduce your model by. You will need to select Preprocess Current and then Decimate Current. If you enable wireframe mode by clicking the PolyFrame icon on the right side of the screen, you should see the tool become lower resolution. The difference between this and just simply lowering the subdivision levels is that Decimation Master will retain details as best as it can while optimizing the rest of the mesh. Subdivisions are broader changes that can lose a lot of detail in the process. As a note, this will kill off any subdivisions you have so it is recommended that you save a backup copy of your model just in case.

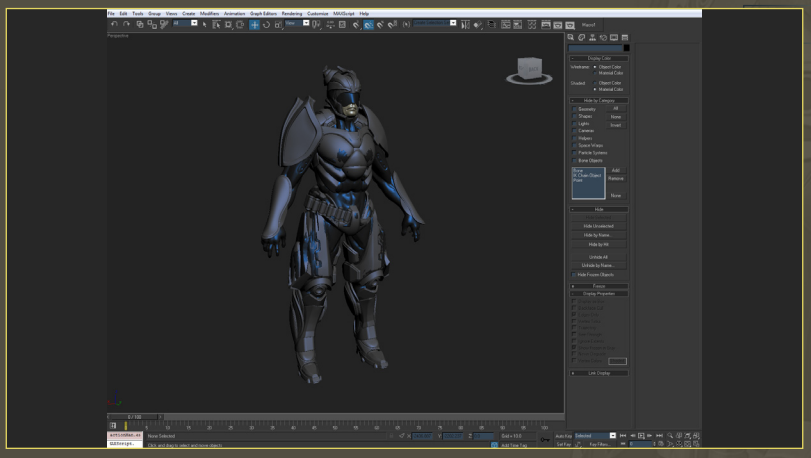


Fig 26

You can repeat this process until the model becomes a resolution that is acceptable for your machine and 3D viewport (**Fig.25**).

Export this new model as an OBJ and import it into Max.

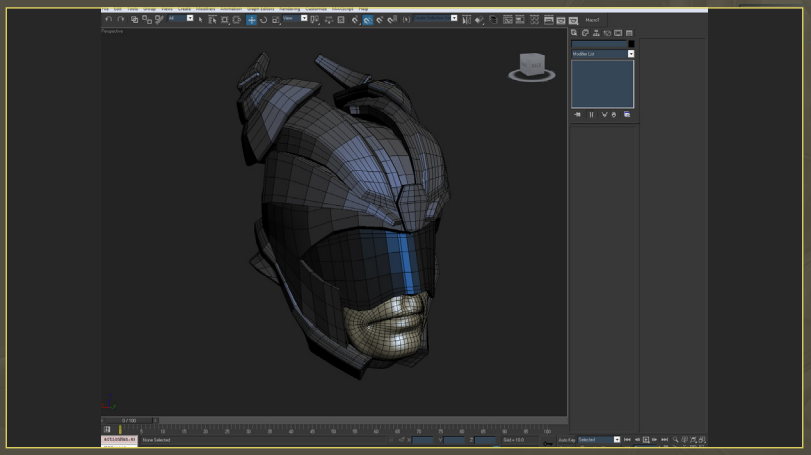


Fig 27

In the following steps I will be covering the armor pieces by sections and breaking down the different elements involved. The idea here is that I create a plane, like how we began the original organic base mesh in the first chapter, and essentially trace the armor plates that we sketched out in ZBrush. In this step, you can see the final true base mesh assembled together (**Fig.26**).

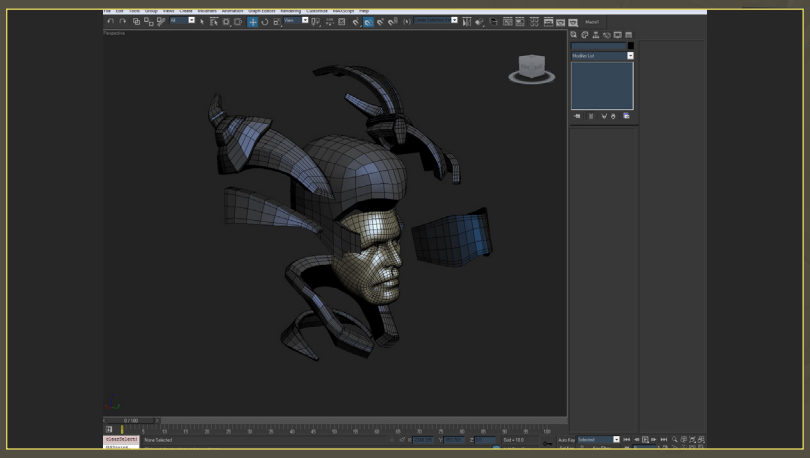


Fig 28

Starting with the helmet, you can see there are many different armor plates causing a layer effect. We want to sculpt in many of the tighter plates and surface detail, but keep the hard lines from the bigger plates that overlap on top of the head, the bridge of the nose and the antennas (**Fig.27**).

As you can see, most of these pieces are fairly dense and have evenly distributed polygons for cleaner sculpting. Most of the sculpting performed on these pieces will be surface details such as bolts, seams and other grooves.

For each element pictured here, a separate OBJ file will be exported in its “assembled” position, of course. For example, the visor, helmet base and antennas will all be separate files going into ZBrush (**Fig.28**).

Next is the chest. A key thing to notice for the armor, I think, is that the entire suit is practically symmetrical, excluding a few extra details like the bullet belt near the waist and the shoulder pads, which add a natural asymmetry to the design. This makes our lives much easier as we can basically model one half of each piece and mirror it on the X axis like we did in the first chapter (**Fig.29**).

For the chest you can see many different overlapping elements that I feel are necessary to keep the hard edges intact. We’re focusing on the bigger, bolder shapes of the actual armor plates and will tackle surface details in ZBrush. A good rule to follow, I feel, is that if the model would be a separate piece in real life, it should be separate in the base mesh. Indents and ribbing can easily be added in ZBrush, as you will see in later steps (**Fig.30**).

The back armor focuses on bigger pieces, overlapping to create a faux shoulder blade look. For the moment we’re going to leave the lower back exposed and tackle that in the sculpt. In the final, rigged product we’ll want most of the midsection exposed/deformable so that the character can naturally bend. This would be a tough sell if the entire back were armored, so we will sculpt a spine protector into the under armor (**Fig.31**).

The back armor has a few interesting points in the design, such as the subtle lip on the side of the main center piece and the main shoulder blade piece, which has a less rigid, more organic shape that conforms to the shoulder blade (**Fig.32**).

Fig 29

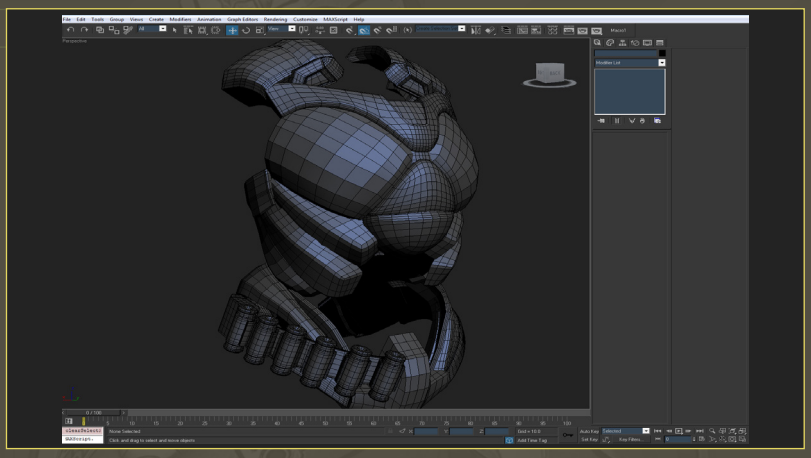


Fig 30

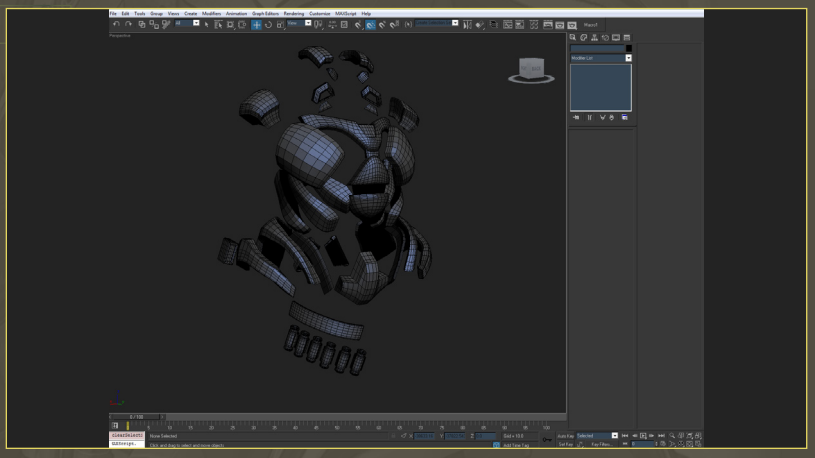


Fig 31

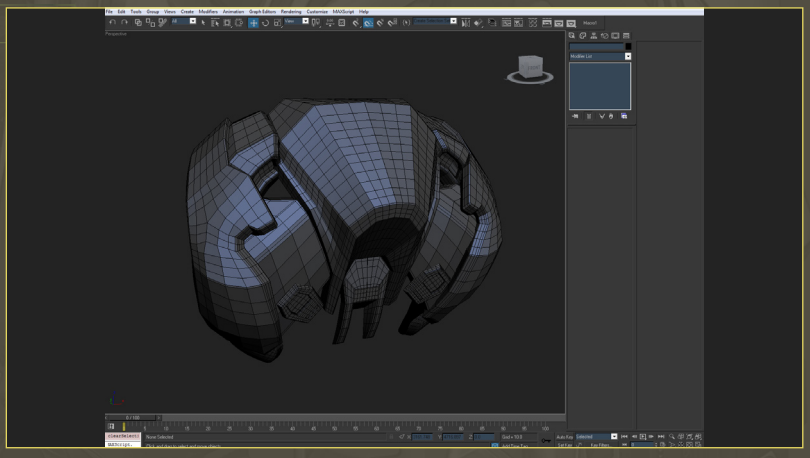
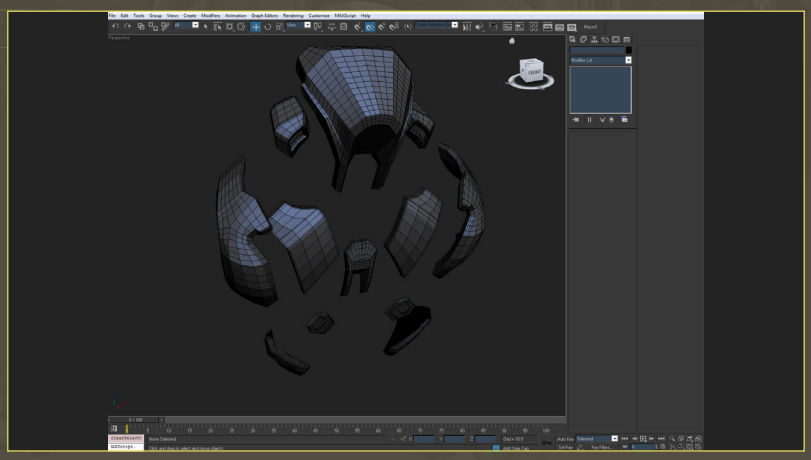


Fig 32



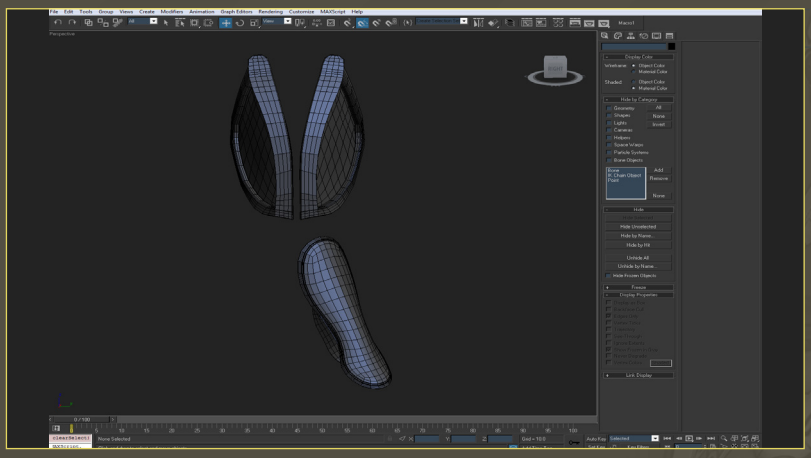


Fig 33

The right shoulder pad has a very interesting shape and is mirrored right down the middle, assuming that some form of connector is on the under armor For the shoulder pad itself, we're going to model in the strong recess and tackle the finer details in ZBrush (**Fig.33**).

The shoulder pad is simply two halves that will be exported as one OBJ into ZBrush.
The forearm guard is a more organic, almost peanut-shaped, armor plate that conforms to the character's forearm. There are also two panels that hang down from this piece, almost as if they are grabbing onto the arm. For the forearm plate, I've decided to model in the rim, but this could also be done in ZBrush.

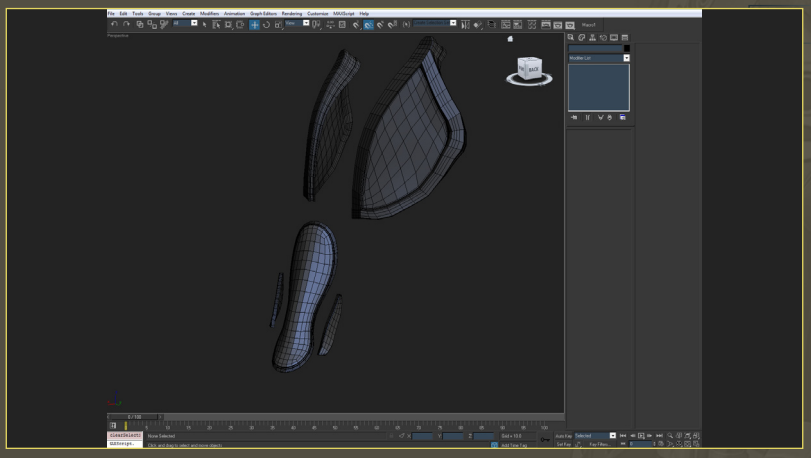


Fig 34

Mirror the forearm guard and its pieces over to the left arm and then export it as one piece (**Fig.34**).

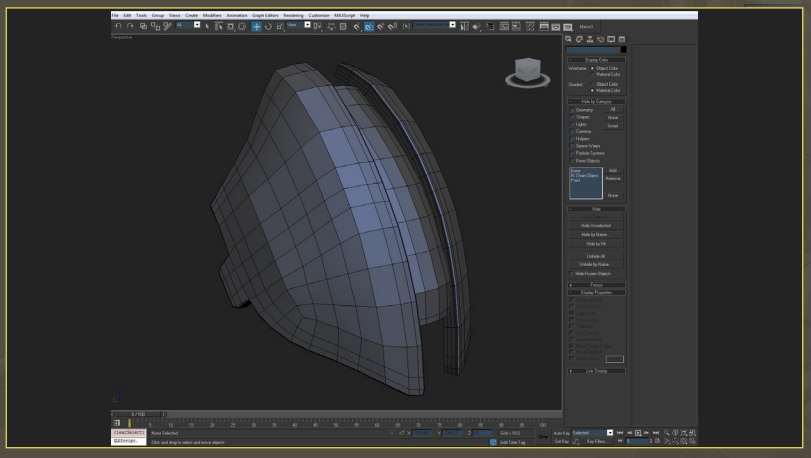


Fig 35

The left shoulder is a fairly simple shell split down the middle, much like the right side and as a middle insert covering the deltoid muscle (**Fig.35**).

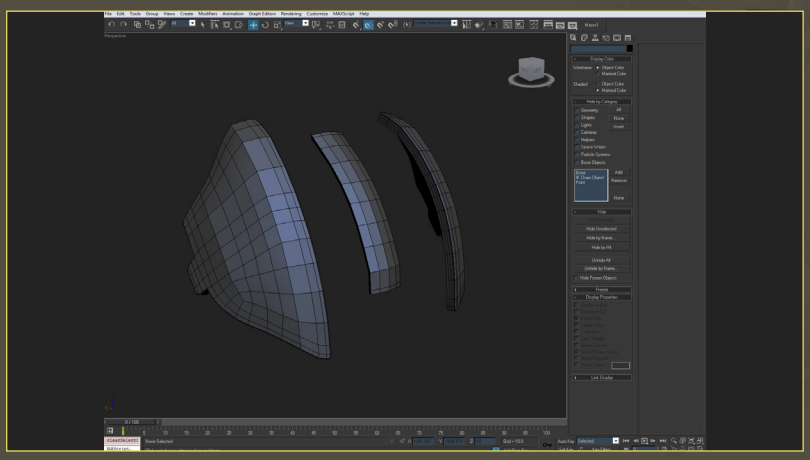
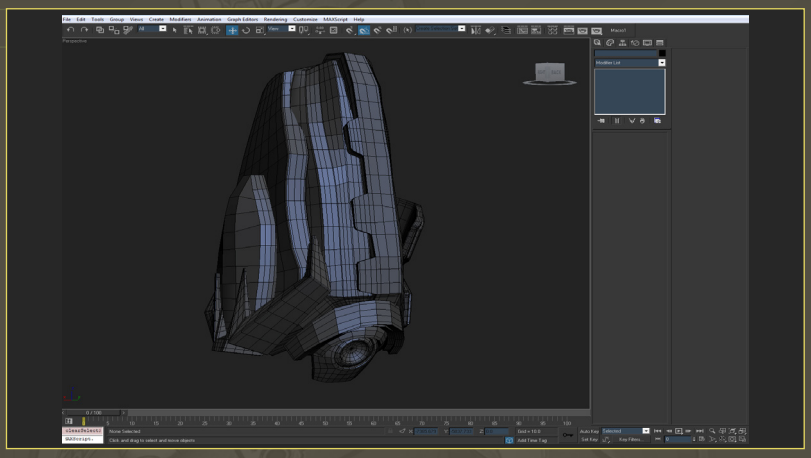


Fig 36

I've decided to model a section that would mimic a connection point as it gives an opportunity for interesting detail. Even though we won't see and probably won't touch the underside of the armor plates in the sculpt, it's good practice to model it in as the final, game resolution model will need that geometry to make the shoulder pads not look paper thin (**Fig.36**).

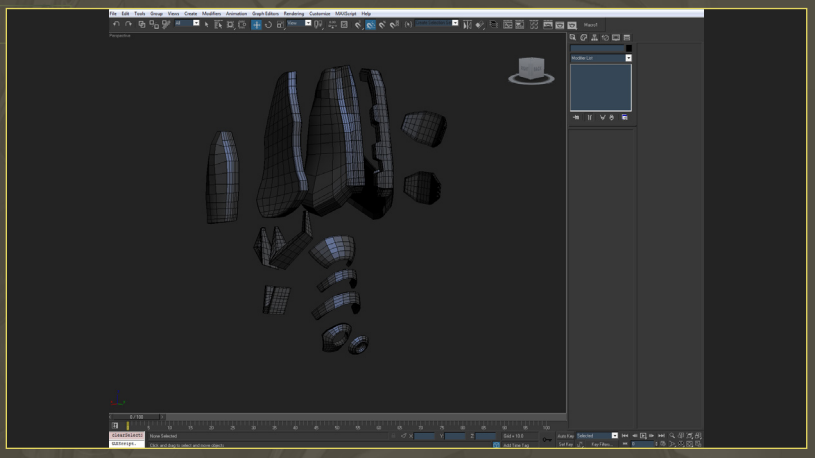
As mentioned earlier, the upper leg armor is probably the most complicated section of the armor suit due to its overlapping, intricate plating. As you can see, there are multiple organic metal pieces, curving inward as the armor nears the pelvis. There is as a plate that wraps around the leg, with tabs, connecting it to the outer leg sections (**Fig.37**).

Fig 37



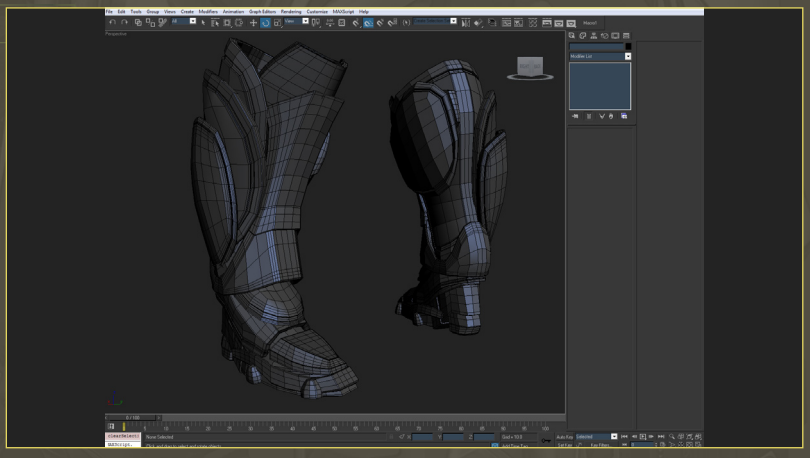
We benefit greatly from simply modeling these sections as separate elements. Once blown apart, you can see the many rather simple pieces combine into making a fairly complicated piece (**Fig.38**).

Fig 38



The last section is the boots for our character. As you may have noticed, I haven't bothered sketching this section out in the sculpt as I have a pretty good idea about how the model is going to come together (**Fig.39**).

Fig 39



The boot is mostly a skin tight armor plate that has multiple shells layering outwards from its core. For deformation purposes, we want to keep the ankle fairly flexible, so cap off the ankle with a brace which will allow the foot to move freely come animation time.

During the entire modeling process for these pieces, it's a good idea to toggle between subdivision levels to see what the model will look like once subdivided in ZBrush. Ultimately, though, you want to export all of the pieces at their lowest subdivision level (**Fig.40**).

Fig 40

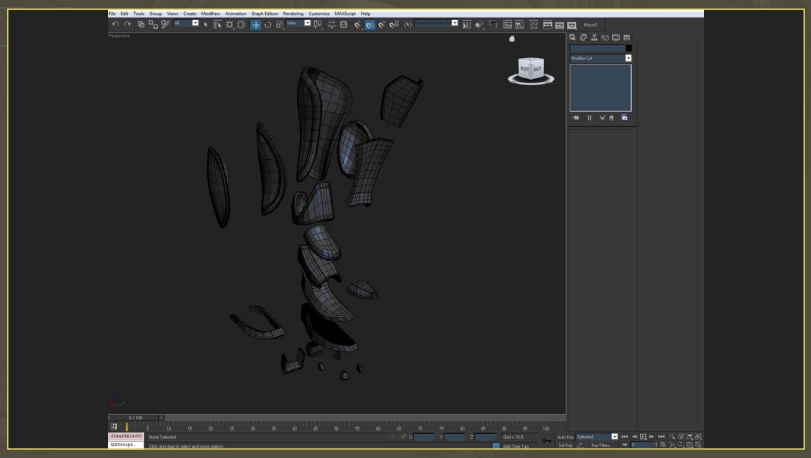




Fig 41



Fig 42

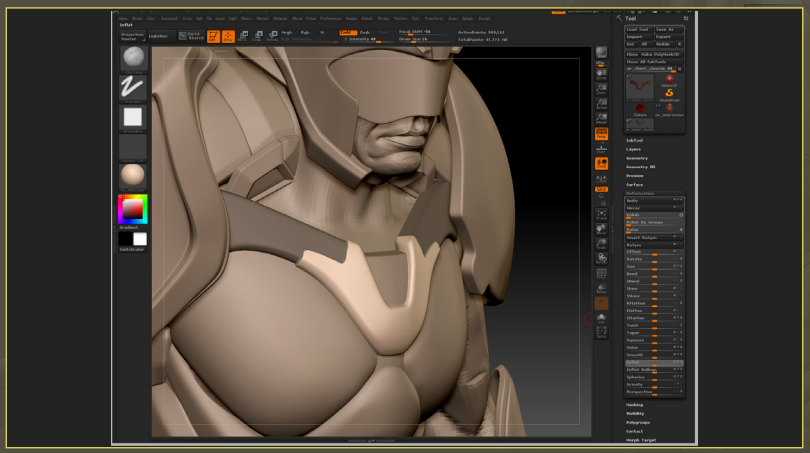


Fig 43

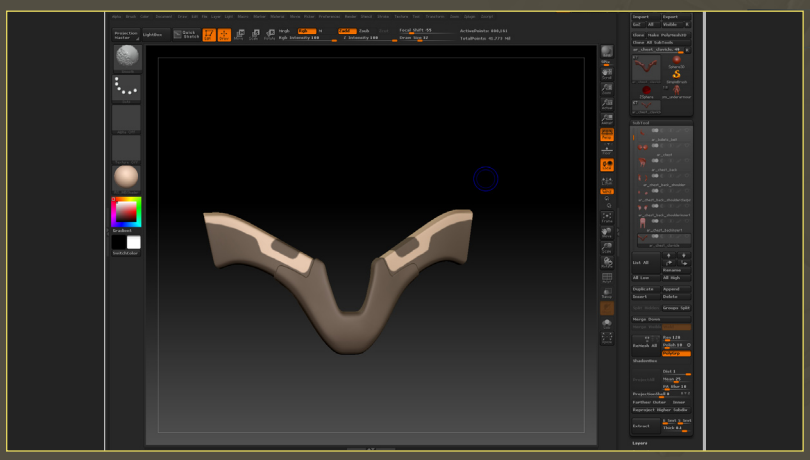


Fig 44

Export all of the models as OBJ files and import them into ZBrush. You can either import each one manually or use the Multi Append feature within the Subtool Master plugin provided by Pixologic. The general rule I follow is that if the model is mirror, I export it together. So, rather than having a left forearm guard and a right one, I simply have one piece. The reason for this is that it means you can just activate symmetry in ZBrush (X) and sculpt both halves at the same time. This can be an issue on older machines, though, as the model itself will become heavier as you subdivide. If that's the case, you can easily export and sculpt one half, then mirror it over for the final presentation.

For each piece, subdivide it multiple times and get to work. Since most of our details are just on the surface, building up detail isn't as important as we've done most of that work already (**Fig.41**).

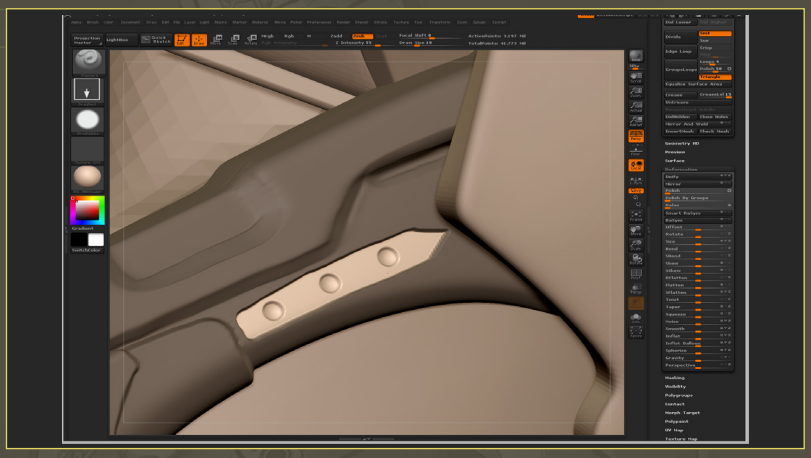
For the majority of the layered plate effect throughout this armor suit, we will be hand painting masks and pushing them out, later refining them with a standard and flatten brush. This is more or less a continuation of the techniques we used previously, but will be focusing more on individual armor pieces (**Fig.42**).

Once the sternum center plate's mask has been painted, click off of the model while holding down Ctrl to invert the selection. This makes the unmasked part deformable. Next, used the Inflat deformation modifier in the right hand panel. You can either manually enter a number after clicking on Inflat or use the slider to enter the value you'd like. I always use this value in XYZ, though you can isolate an axis by simply clicking on its icon (**Fig.43**).

Next, mask out the clavicle ridge and repeat the process of inflating it outwards. After it has been inflated, run a square flatten brush along the inner edge to give it a more organic feel (**Fig.44**).

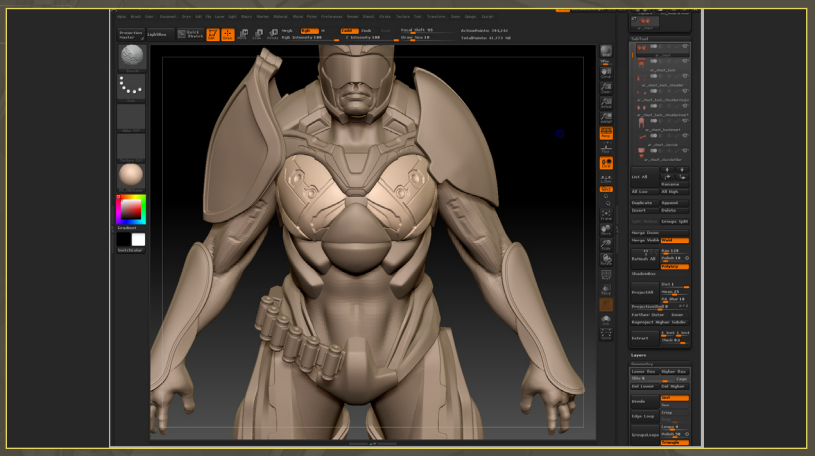
After this, mask out an insert section under the clavicle area and Inflat it to a negative value, which will, of course, push the model in rather than out. Next, switch to a standard brush and set the mode to DragRect. This will more or less stencil in a detail rather than painting on detail in a stroke. I like to use this for isolated details like bolts and other types of information. With a stock circular alpha, draw out three dots as indicated in the concept art. You'll notice that DragRect requires you to hold each stroke until the final detail is placed, rather than flicking your pen or mouse to draw out detail (**Fig.45**).

Fig 45



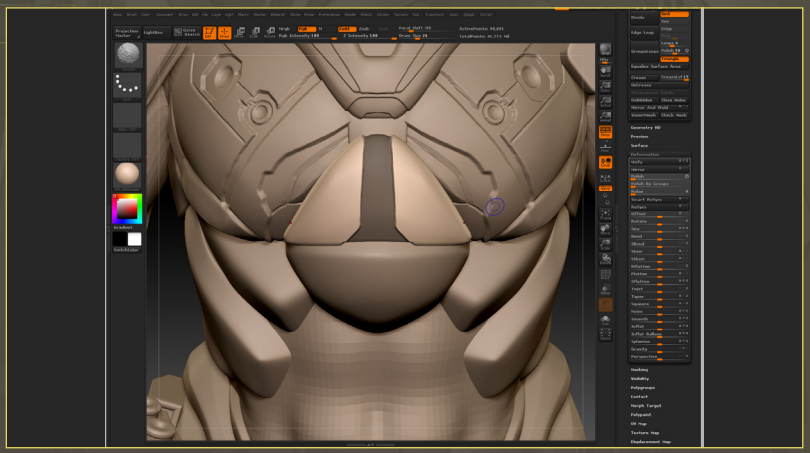
Continue this process for the finer details along the breastplate. Masked everything out and push it inward or outward with the Inflat deformer. For the really fine lines that lead to the deltoid area, use a standard brush with Lazymouse enabled to achieve smoother lines (**Fig.46**).

Fig 46



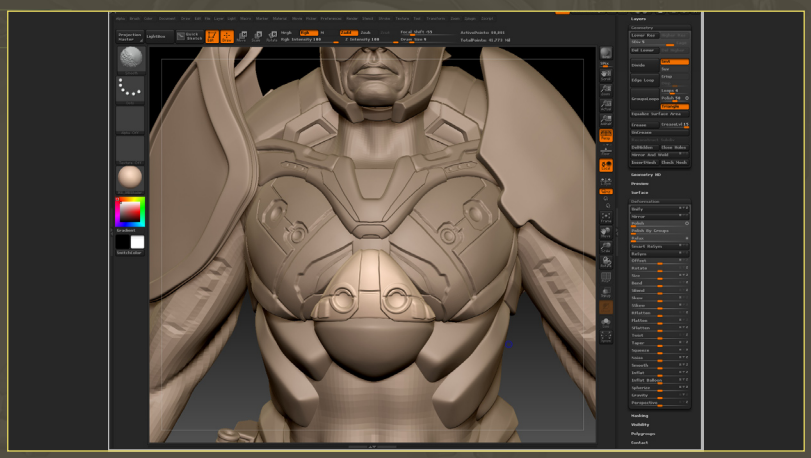
Next, mask out the panels on the sternum protector. To fully mask around the entire object, you may need to hide the other subtools. This can be done by holding down Shift and clicking over the subtool in the Subtool panel. This will hide all of the subtools that are not currently active. Repeat this process to unhide the subtools (**Fig.47**).

Fig 47



For the detailing, mask out square spaces and inflat them out. After this, create a custom alpha for the circular, port type areas to be used with a standard brush with a DragRect stroke type (**Fig.48**).

Fig 48



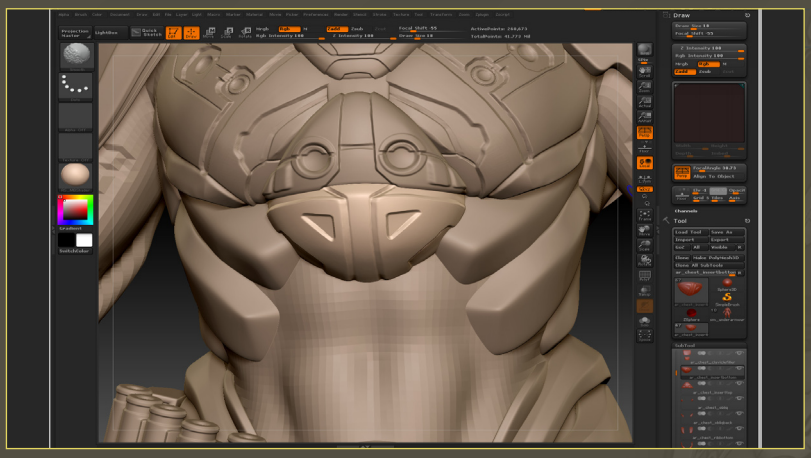


Fig 49

Continuing on with the lower half of the sternum protector, mask out and inflat the paneling detail and create a custom alpha for the triangular type indents near the center of the piece. As you can see, flattening out the edges and popping out grooves with a standard brush really gives the model a stronger look and will eventually bake down better when we create our normal maps (**Fig.49**).

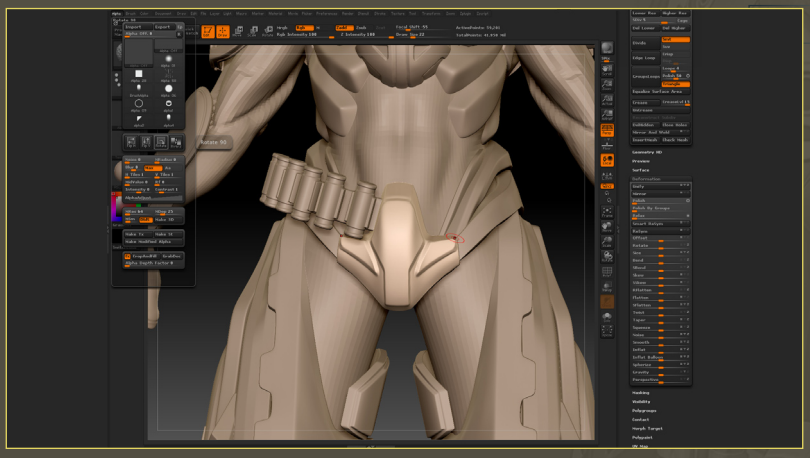


Fig 50

Moving on to the codpiece armor section, you can see a lot of the same theory carried through here. Mask out the main three plate details and inflat them out, rounding out the details with a flatten brush (**Fig.50**).

For the most part, the hip armor is mostly finished. In the concept, these sections are fairly simply, as in they mostly consist of a streamlined piece with very little surface detail. This is great as it will allow the eye to rest and avoid the problem of just having a mess of random details that cause the character to be hard to read. There is one key detail, however, and that is the circular indent and the seam connecting the top and lower halves. For the circular detail, simply create a custom alpha and import it into ZBrush. For the seam, this can be painted in with a standard brush using Lazymouse (**Fig.51**).

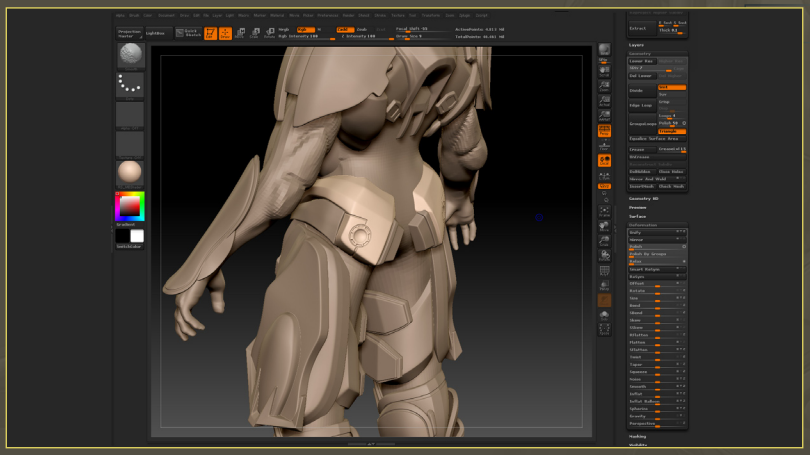


Fig 51

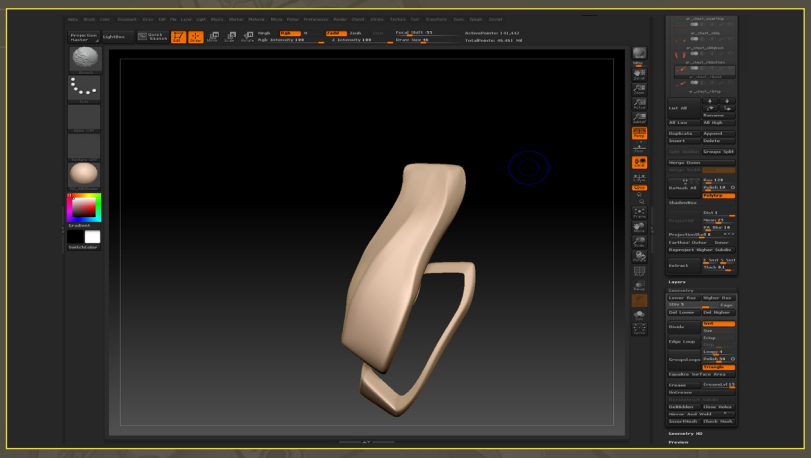


Fig 52

The rib plates, like the hip sections, are fairly basic and are mostly done at this level. Mask in a section for the inside of the ribs, which will act as a home for an LED section to give our character a material change. You can also bring out a nub, which could be interpreted as a connector point as well as the seam which would assist with that detail (**Fig.52**).

For the most part, we can repeat those steps on the next two rib plates, along with flattening out a broad section towards the top of each piece to give each rib plate a more organic feel (**Fig.53**).

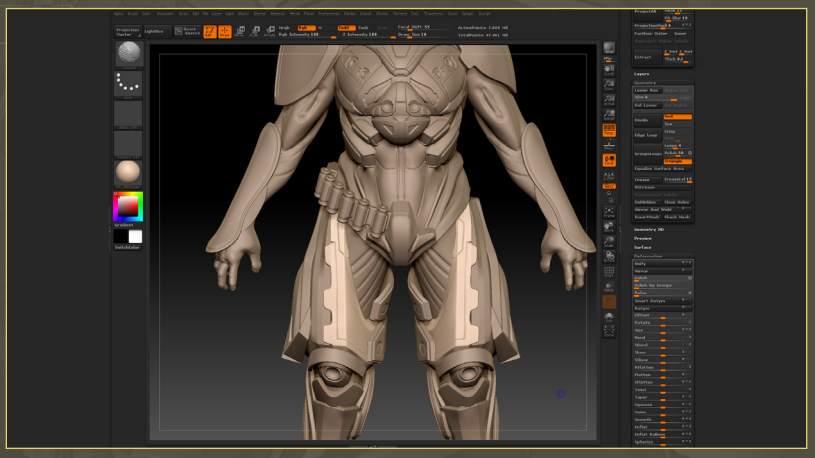
Fig 53



At this stage you can also begin roughing in detail into the under armor. I've basically smoothed down the under armor where it would be clipping through, or near clipping through armor pieces, leaving the fairly exposed sections like the stomach and arms as a base for the final sculpt. Blocking in details, like the ribbing on the legs, will help you to visualize what the final product will be.

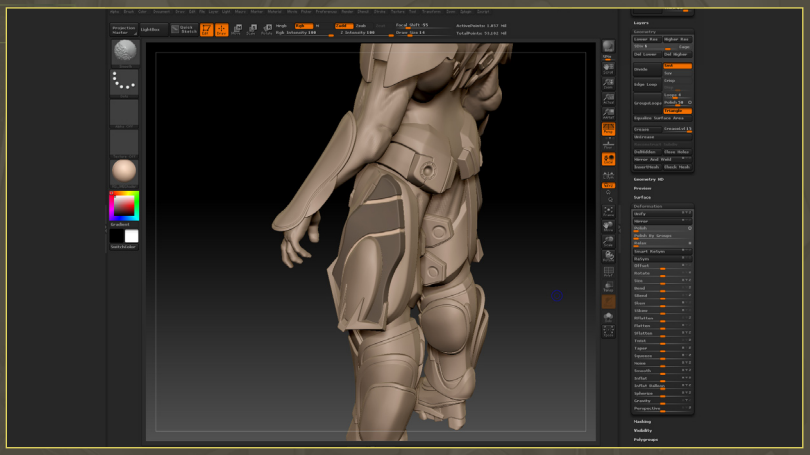
For the inner leg armor plate, mask in an indent towards the crotch just to give some visual interest and add a small seam outlining the tabbed sections (**Fig.54**).

Fig 54



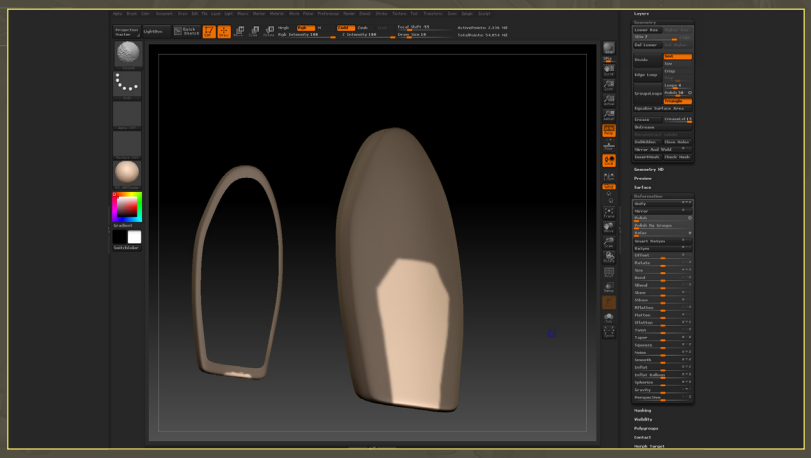
The outer leg armor has deep grooves to give its layered effect. To do this, simply paint where these plates would be and inflat them out. Performing this task the traditional way would take so much longer as you would spend so much time making the model's topology line up just right for a smooth subdivision. This method literally takes a minute (**Fig.55**).

Fig 55



Now, moving onto the dome plate on the side of the leg, mask out the outer insert shape and push it inwards with the Inflat deformer (**Fig.56**).

Fig 56



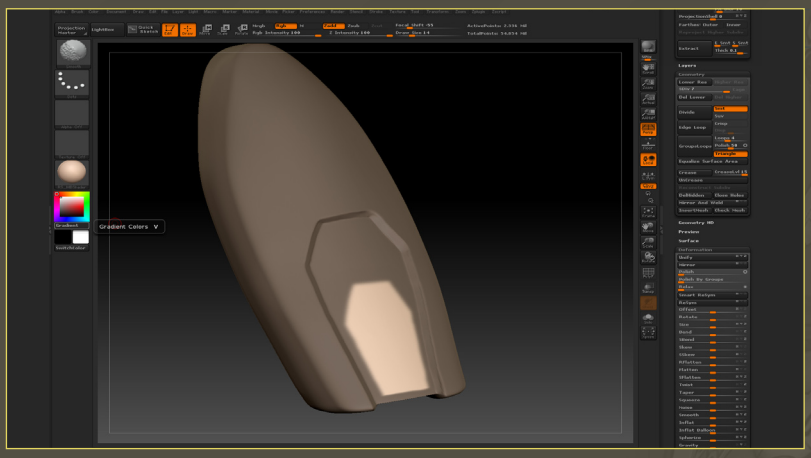


Fig 57

Repeating this process for the inner insert section, paint it out and Inflat it with a negative value. If you find that your lines are not crisp enough when painting masks, you can enable Lazymouse for your masking brush. While holding down Ctrl to access your masking brush, navigate to Stroke > Lazymouse and enable it, adjusting its settings to your liking. Likewise, if you find that your masks are too sharp and are causing artifacts when you inflat the mesh, you can easily blur the mask by holding down Ctrl and clicking on the model (**Fig.57**).

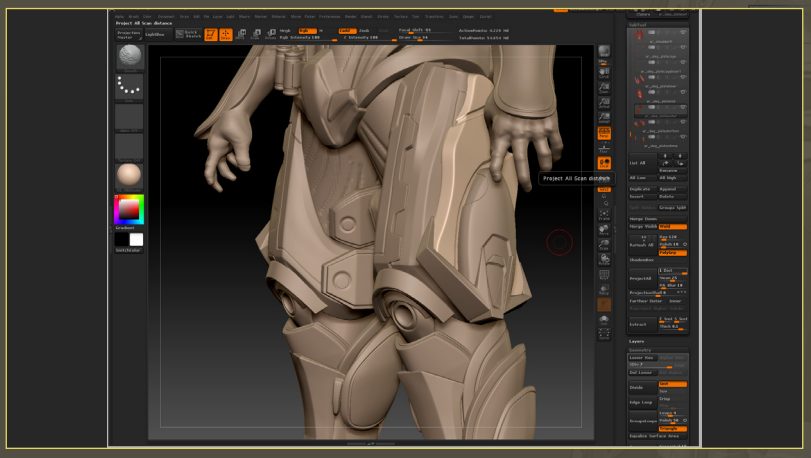


Fig 58

The final composition for the leg armor shows that, really, the detail that we blocked out earlier is really enough information for this section. Adding too much fine detail can really become noisy and hard to read. Simply adding a few interesting surface details here and there can have a bigger impact than adding detail to every pixel (**Fig.58**).

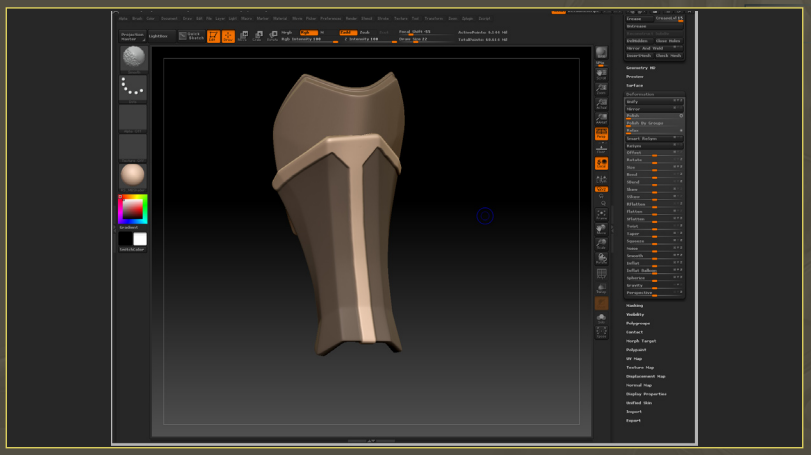


Fig 59

For the shinguard, push out a broad rim that surrounds the top of the plate and runs down the center of the shin itself. After this, add fine seams (which you'll see in the concept if you look closely) with a standard brush using Lazymouse (**Fig.59**).

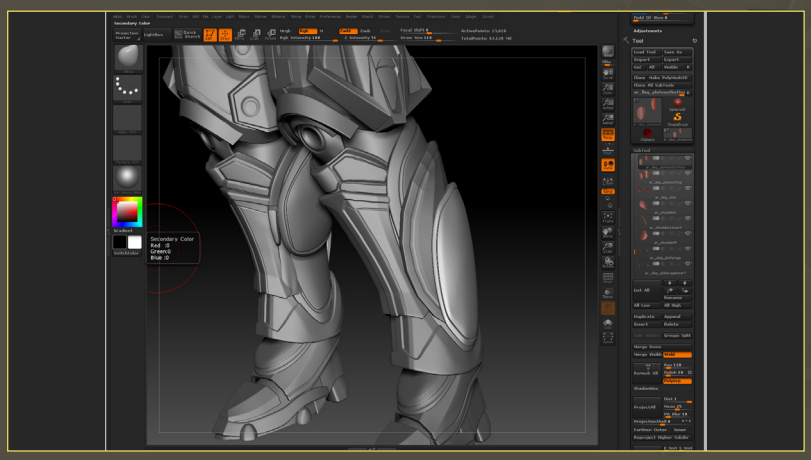
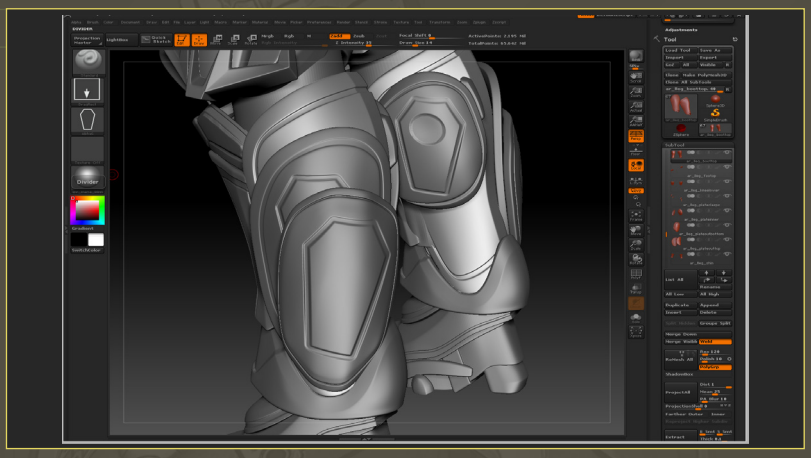


Fig 60

For the calf plates, push them in to close gaps using the Move brush. The reason for this, thinking ahead, is that it will be much cheaper to just model a low poly boot that surrounds this entire armored area rather than modeling the shelves that would have been created with these gaps. This also barely changes the final silhouette (**Fig.60**).

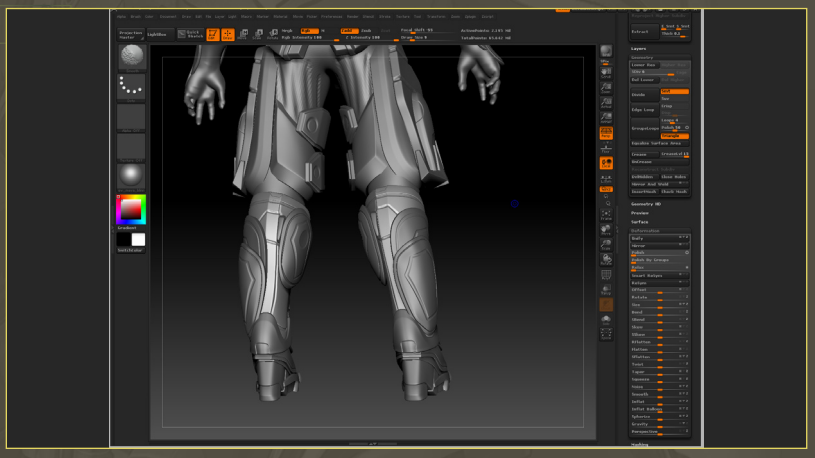
Most of the major seams have been modeled into the base mesh for the calf plates. To add a few interesting details, create a custom alpha (a coffin-type shape that is indicated in the concept art) and drop it onto each plate using DragRect. This creates a nice, subtle layered effect (**Fig.61**).

Fig 61



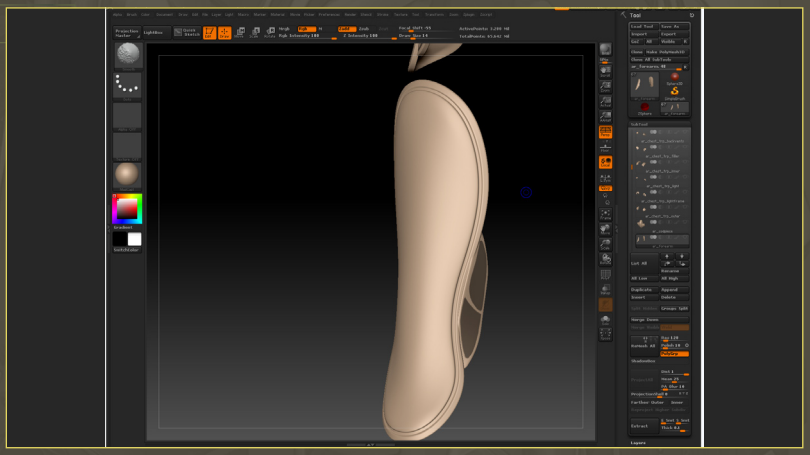
The boots can be mostly left untouched as most of the detail has been covered in the base mesh. Also, it is generally an area that doesn't have a lot of resources devoted to it as the feet are usually an area that most viewers don't pay attention to when playing a video game. That being said, you can go ahead and add a few seams at the back of the leg and the top of the boot. And I've also decided we should take out the detail connecting the boot and the shin armor that was indicated in the concept art as this will certainly prevent the foot from moving realistically in animations (**Fig.62**).

Fig 62



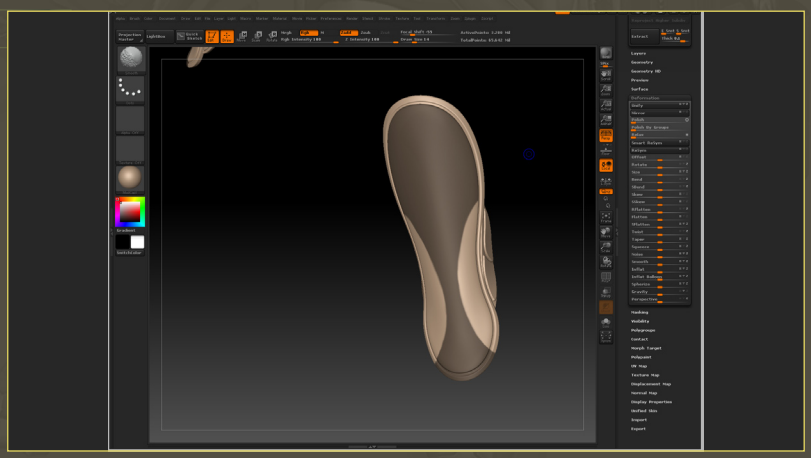
By comparison to other sections of the armor, the forearm plates are fairly basic and straightforward to detail up. Starting with the panels that come off to the side, mask out two chunks and inflat them outwards (**Fig.63**).

Fig 63



Next, mask out the inner shape, cutting it off at the outer trim seam that we created in our base mesh (**Fig.64**).

Fig 64



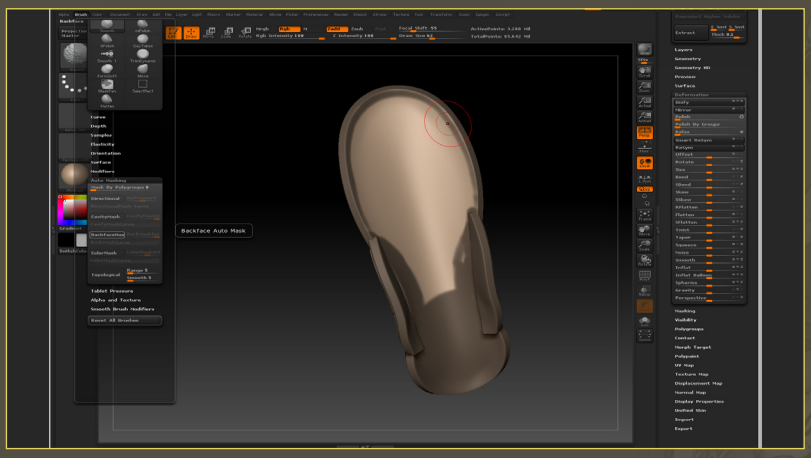


Fig 65

This is a great opportunity to bring up a problem about thin, double sided objects. In ZBrush, if an object has a front and a back side and those two sides are close together and you sculpt on one side, the opposite side will be affected. That is to say, ZBrush doesn't cull out faces by default. However, if you go to the Brush panel and navigate to Auto Masking, you will be able to enable Backface Auto Mask which will remedy this problem. You may run into this problem with the forearm guard as you can't have the back masked out, but have the peanut shape in the front unmasked too (**Fig.65**).

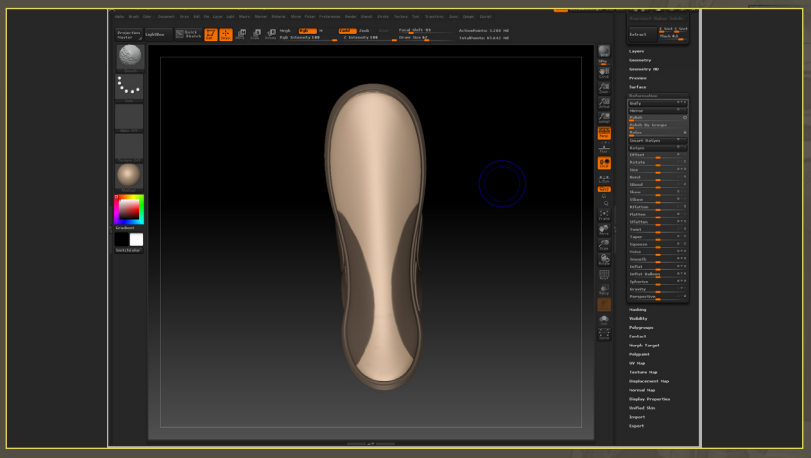


Fig 66

With the final shape masked in, inflat the detail out and refine its shape with standard and flatten brushes (**Fig.66**).



Fig 67

It's always a good idea to take a step back from your sculpt and see how everything looks together, especially with a complex character such as this where there are multiple layers of detail (**Fig.67**).

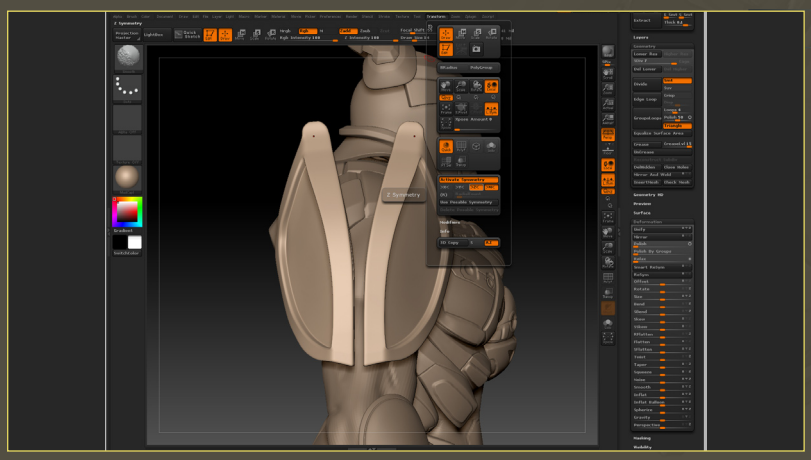
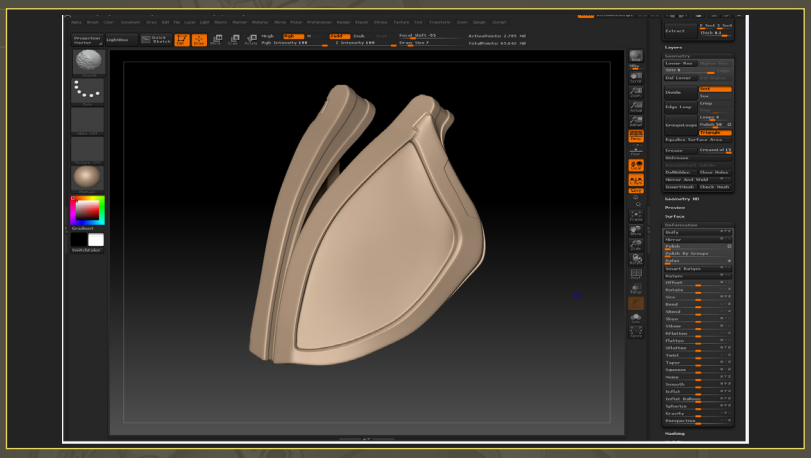


Fig 68

For the right shoulder pad, you'll notice that the symmetry axis for this model is a bit different. Not only is it on the Z axis, it is also off center. In order to make this work, we will need to activate symmetry in only the Z axis and enable Local Symmetry by clicking the Local Symm icon towards the right of the screen. This will use the object's center point rather than the world's center point (**Fig.68**).

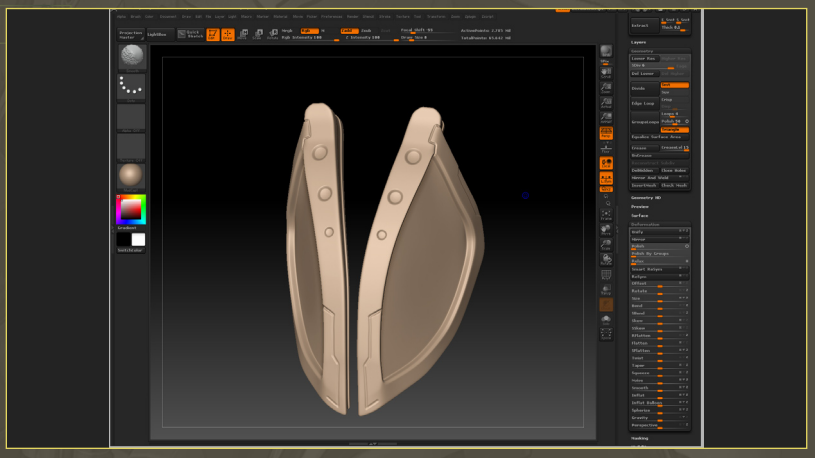
Begin by painting fine seams and masking out indentations on the rim of the shoulder pad (**Fig.69**).

Fig 69



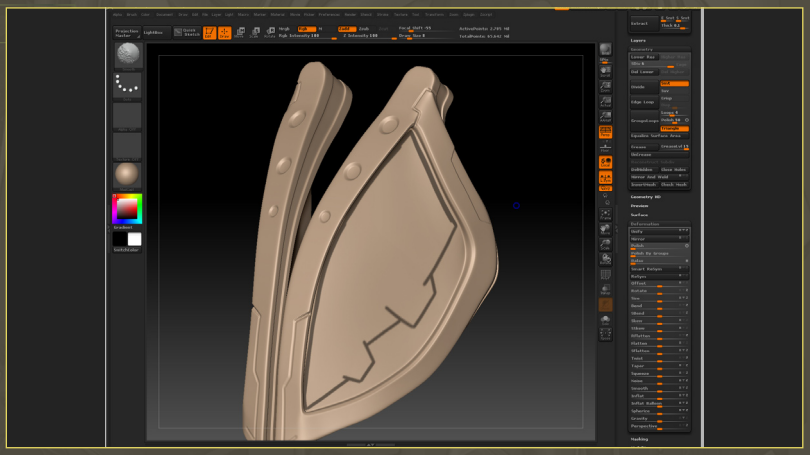
There are some details hinted at on the mood concept image that I really like, such as the holes on the inner edge and the seam work on the frame in general. To translate that into 3D, we can simply use a standard brush for the seams, as usual, and a circular blended alpha set to DragRect for the holes, tapering them in size towards the middle of the shoulder pad (**Fig.70**).

Fig 70



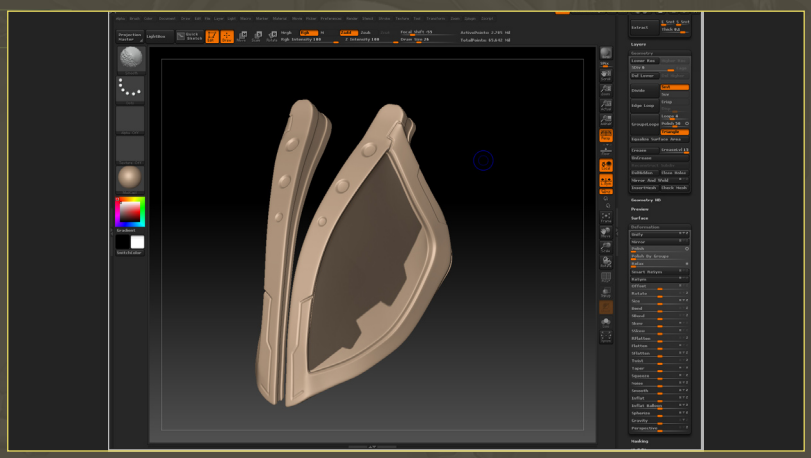
For the inner plates of the shoulder pad, I think it's best to mask out the major shape or the combined shape of all the plates and work in from there. So, to begin, mask it all out using Lazymouse (**Fig.71**).

Fig 71



Sadly, there's no quick and easy way to fill in a shell with the Mask tool. Though, I find it much easier to draw the outline first and fill it in with a bigger brush for the mask. Basically, like a coloring book, it allows you to keep the sharper edges caused by painting with Lazymouse and a fairly quick way of covering big shapes (**Fig.72**).

Fig 72



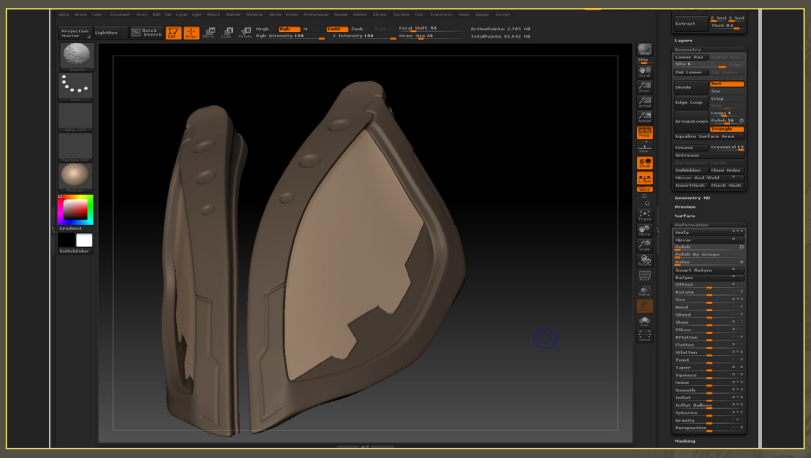


Fig 73

As mentioned earlier, we want to invert the mask and inflat the entire inner plate outwards. This really makes the shoulder pad take shape and you can quickly see how the final product will look (**Fig.73**).

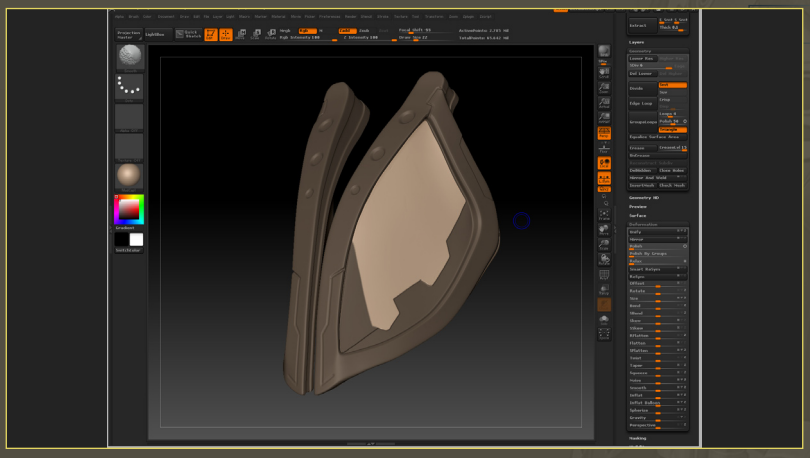


Fig 74

Next, reduce the entire area to include the last two plates and repeat the inflation process. Once that is done, reduce the masking to include only one of the plates and inflat it once again. The final result is a staircase sort of look that will give the illusion of layered metal plates (**Fig.74**).

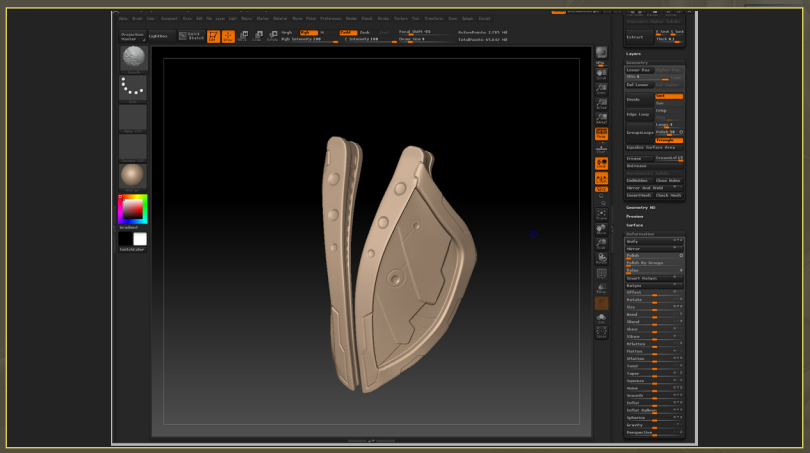


Fig 75

Once all of the plates are pushed out, run a flatten brush over the edge to mimic a beveled edge. After that, drop in a few details like holes, outer rings and thin seams with stock alphas and the standard brush. For the inside of the shoulder pads, drop multiple square alphas using a Standard DragRect brush, being sure to taper them along the way to fit in between the ridges (**Fig.75**).

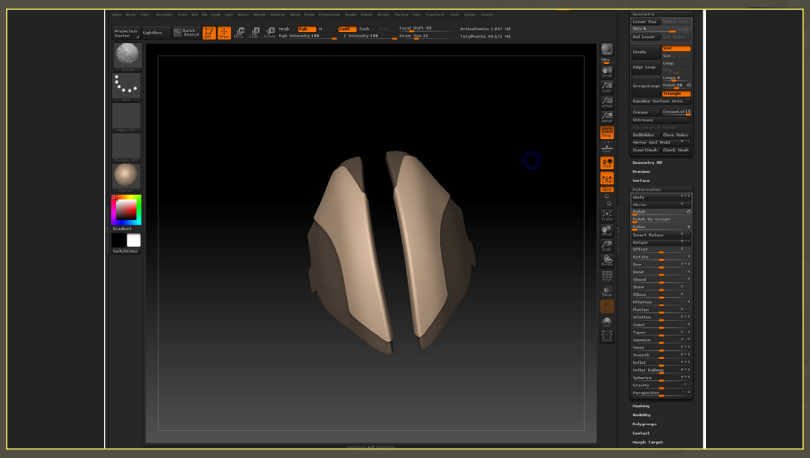
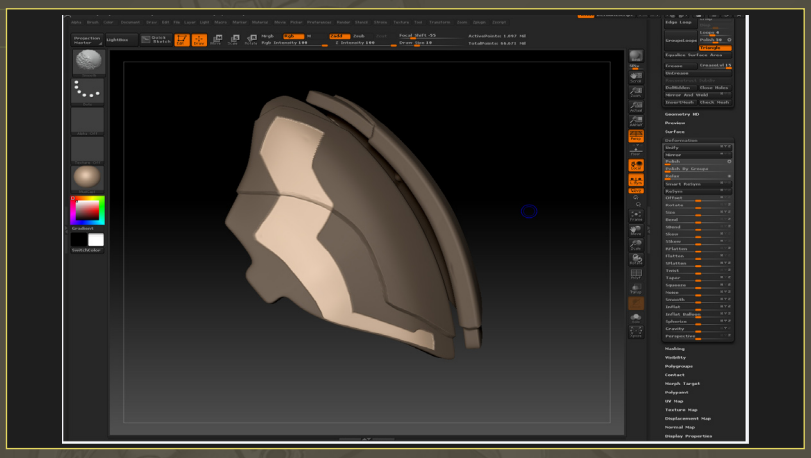


Fig 76

The left shoulder pad has an interesting overlap for its armor panels. First, we're going to tackle the bigger section: the curves from the top corner down to the inner corner. Mask out this section, wrap around the inside of the shoulder pad itself and push out the sections themselves with Inflat (**Fig.76**).

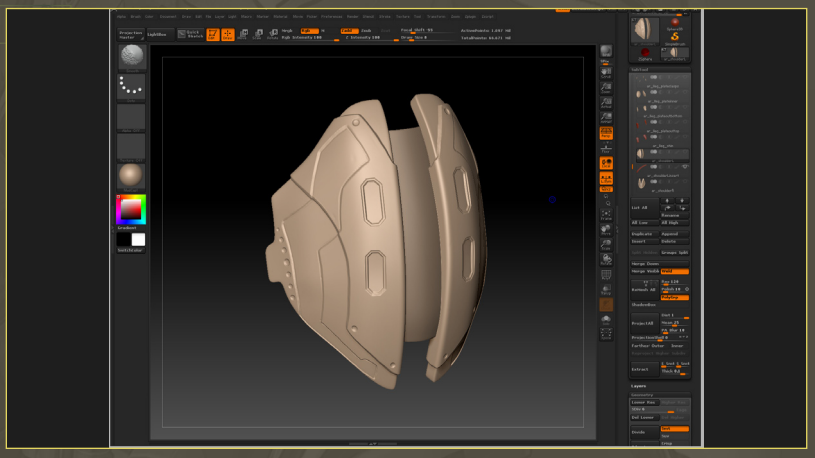
Next, we want to paint the metal section that will be inserted into the shoulder pad by creating the mask and inflating the geometry inwards. This gives a nice organic result as the insert will conform with the previous plates (**Fig.77**).

Fig 77



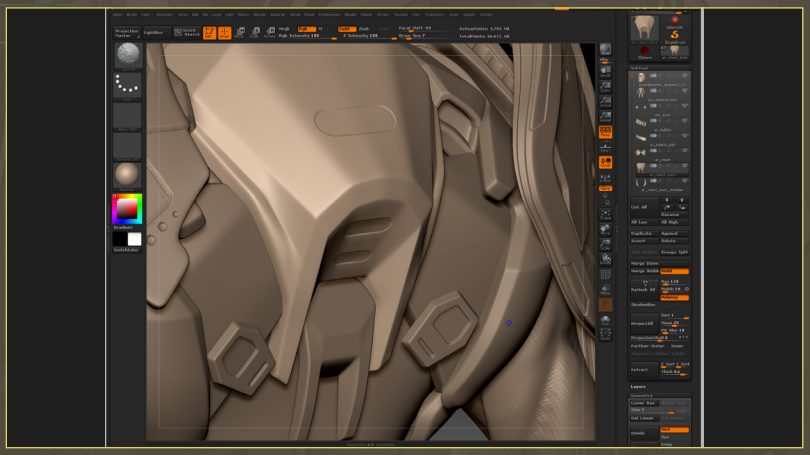
Finally, add a few small details like screw holes and tapered holes towards the connector tab that is hinted at in the concept art. I also created a unique alpha that I import in which is a stretched octagon which becomes our vents (**Fig.78**).

Fig 78



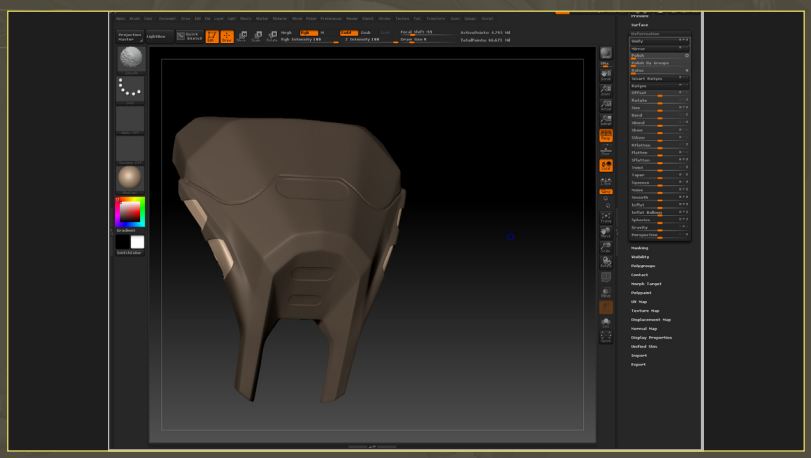
Next, drop a few alphas down to create vents for the main backpack piece. These are custom alphas as well, made by elongating circles and importing them into ZBrush as a 2D, grayscale image (**Fig.79**).

Fig 79



Create the seam up top, which hints towards the idea that this compartment can either be opened or overlaps here onto the lower piece, by freehand drawing with the standard brush. For the inserts on the side of the pack itself, mask the objects out and inflat them inwards (**Fig.80**).

Fig 80



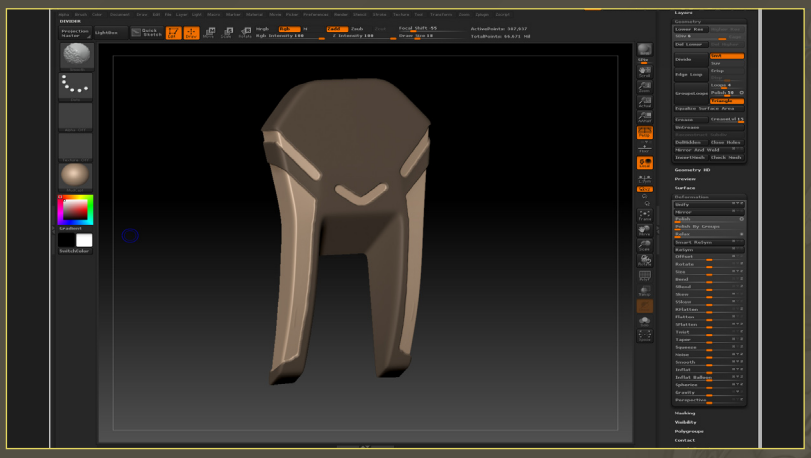


Fig 81

For the backpack insert, simply hand-paint the masks, which is made easier due to symmetry being activated, and push those sections in (**Fig.81**).

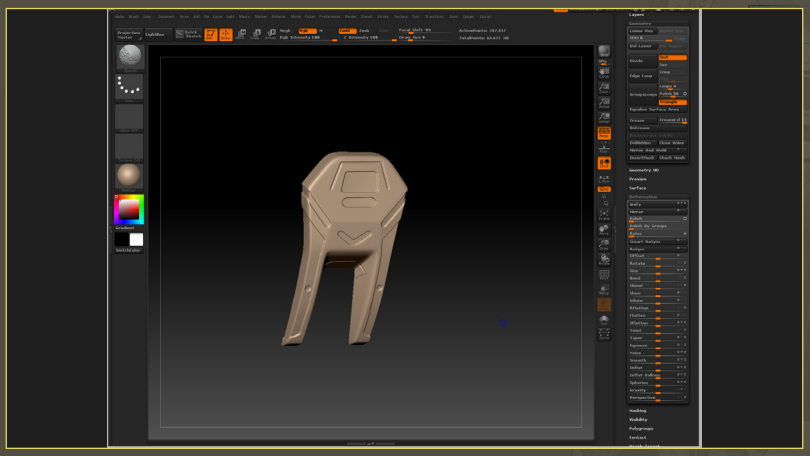


Fig 82

Using a custom alpha for the center details and the stock circular alpha, use the standard brush to finish off the surface details (**Fig.82**).



Fig 83

Skipping over to the neck, on the underarmor subtool that we created earlier, smooth out the area and flatten out the sternomastoid muscles by using a flatten brush with a hard square brush. This allows us to have a natural look to the neck area, as if it can still move slightly, but still hint to the fact that it is armored by adding these somewhat hard edges (**Fig.83**).

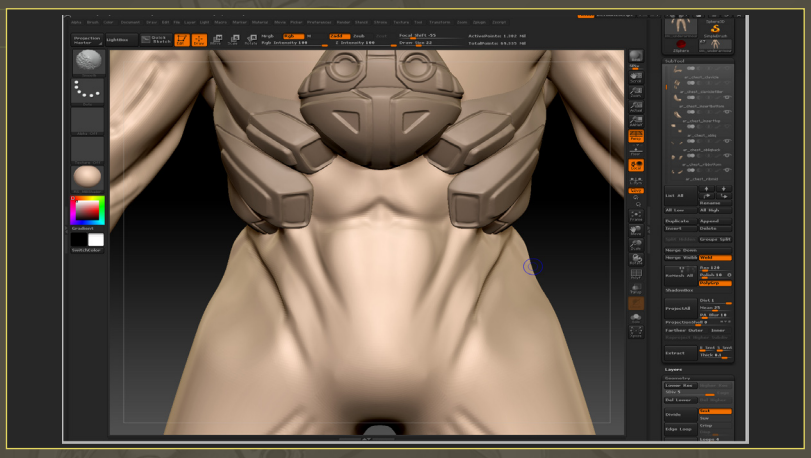


Fig 84

Next, using a standard brush, draw in the ribbing that will allow this section to bend in on itself. Try to get each line as even as possible as, for the most part, it's all eyeballed. Don't be afraid to hide other, inactive subtools to overpaint detail here to hint that the ribbed detail would continue under the armor plates (**Fig.84**).

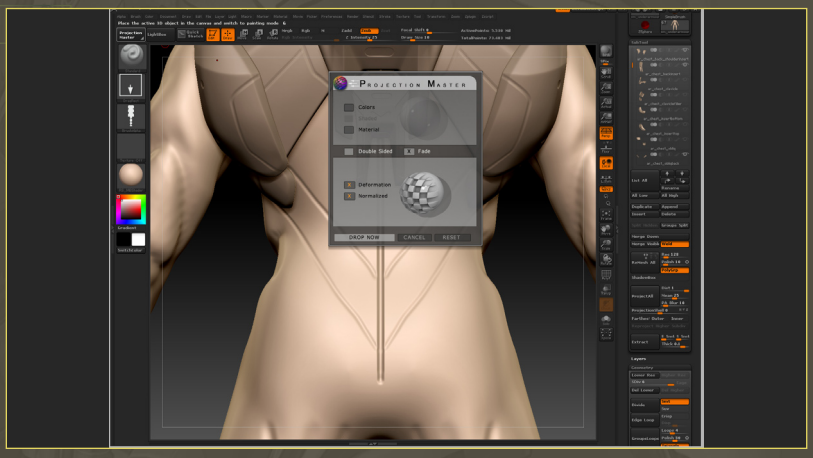
Moving down to the abdominal section, loosely sculpt in the muscle detail here, being sure to not go overboard as much of the material over the top of the flesh would hide these cuts. Once the muscles are blocked in, run over the surface with a higher intensity brush to create seam work that would allow the material to deform and also adds a nice point of interest (**Fig.85**).

Fig 85



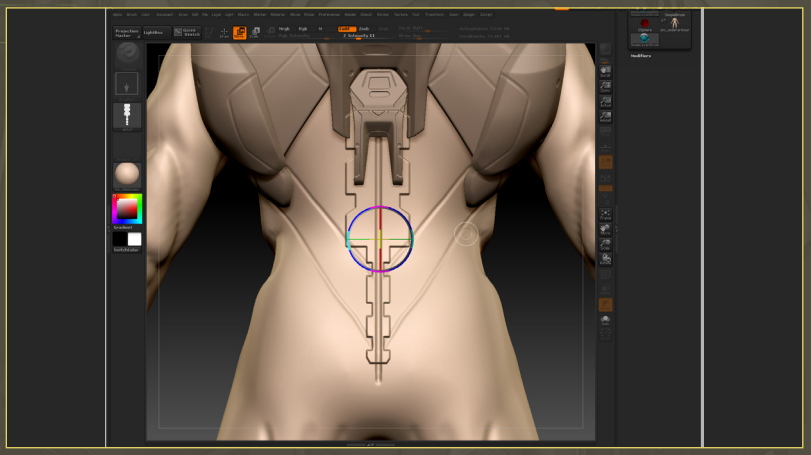
Moving around to the back, add some seams that roughly follow the flow of the back muscles on a human. You'll notice that there is a nice detail insert that will act as a spine protector in the concept. To tackle this, rather than using the DragRect Standard brush, let's use Projection Master.

Fig 86



Projection Master essentially locks your model temporarily on a 2D plane. From here, you can drop detail onto the canvas which you can then move and scale, and also change the intensity and directionality of. To enter Projection Master, simply click on Projection Master in the top left corner with your subtool active, enable Deformation and Normalized (just for this example – you certainly can use the other features in different scenarios) and click Crop Now (**Fig.86**).

Fig 87



Next, import the alpha that you've created, which consists of tapering hard edges that mimic the human spine, and draw it onto the canvas. This should seem familiar as it is practically the same as the DragRect Standard brush function, just much easier to control in this situation and with the ability to alter the information after it has been drawn onto the canvas (**Fig.87**).

Fig 88



Once that detail is in place, click on Projection Master again and select the Pick Up option. This will convert the details on the 2D canvas onto your 3D model. Once this is done, mask out the panels that run from the spine to the delts and inflat them outwards (**Fig.88**).

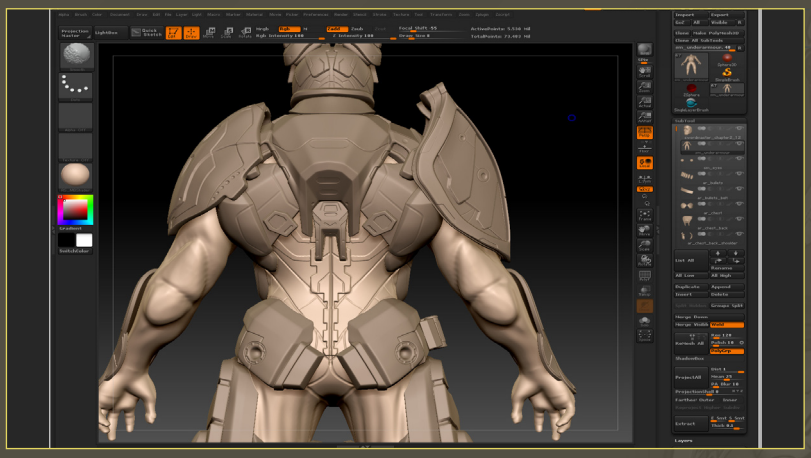


Fig 89

To finish off the back, draw in a few seams with a standard brush that just help break up the area (**Fig.89**).

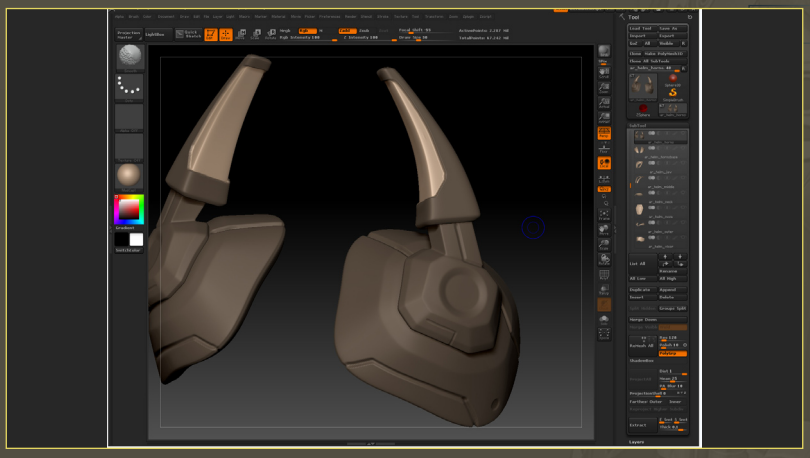


Fig 90

Moving on to the helmet, we're going to start with the antennas. Freehand in the seams to give the impression that this piece could come apart and is even daintier than the other armor pieces. Also mask out the inner section, which will be pushed inwards and detailed up (**Fig.90**).

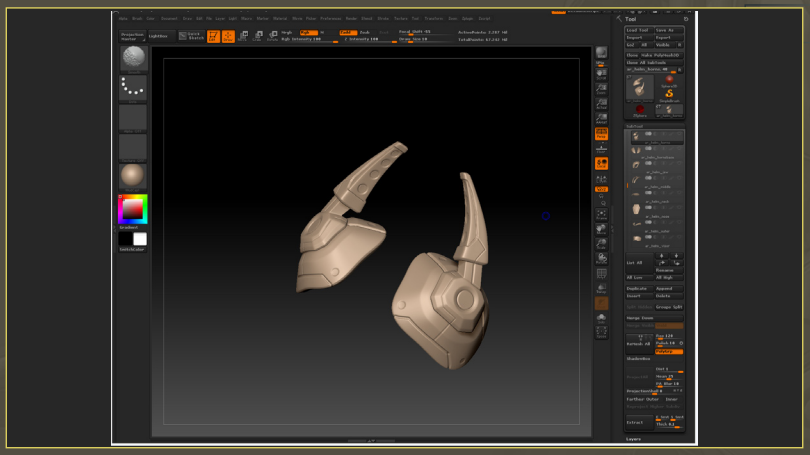


Fig 91

To finish of this section, drag in circular details for bolts and pieces that hint towards receptors or some type of communicator. Punch up the details by running a standard brush over them, for the most part sharpening grooves (**Fig.91**).

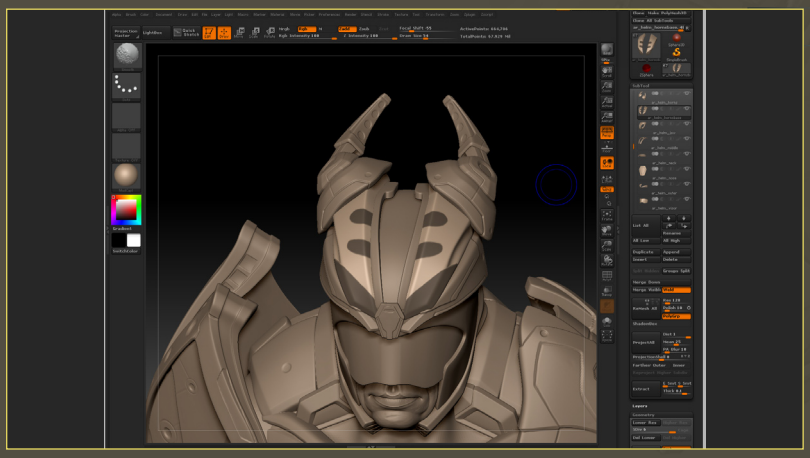
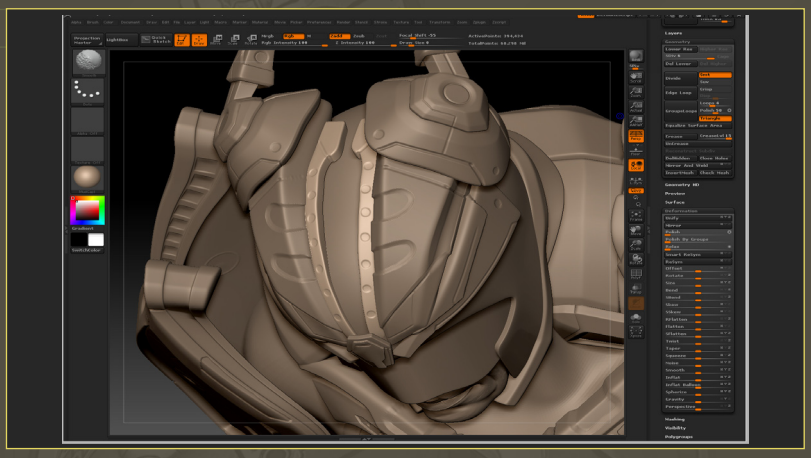


Fig 92

Moving on, the nose bridge armor has a fairly interesting pattern in the concept created by bulking up the metal plate with different layers. The armor band running along the top of the head is also an interesting piece in that it has a nice organic curve that, I think, helps pop it out from the otherwise sharp looking helmet. Once you've painted the curve, mask in the inserts and push them inwards, polishing them off with a flatten brush (**Fig.92**).

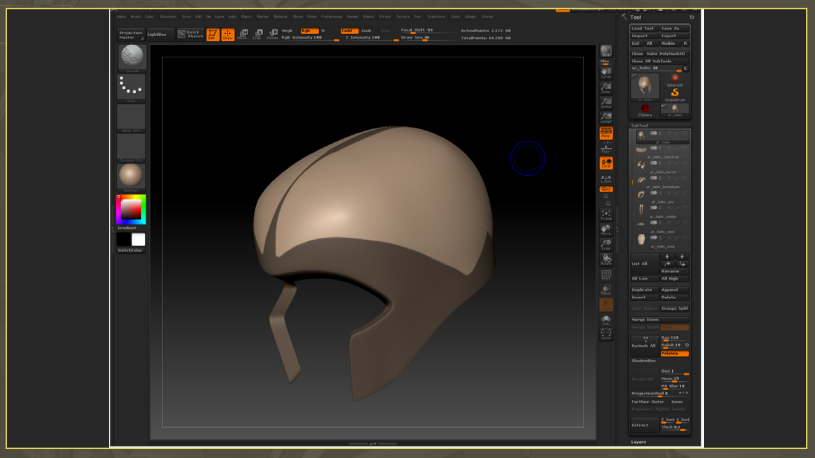
For the remaining armor plates that we have created base models for, sculpt in a few seams with a freehand standard brush. For the center plate on the top of the head, use the Stitch brush with a circular alpha. The Stitch brush acts much like a standard brush with Lazymouse enabled; just that rather than painting a solid stroke, it will space out the alpha equally making it ideal for repeating patterns like stitches and bolts (**Fig.93**).

Fig 93



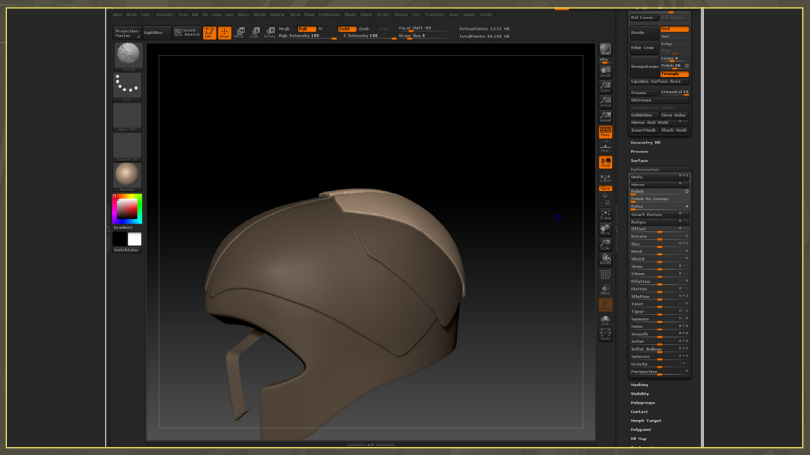
Moving on to the base of the helmet, the process for creating the plated materials that are close to the head resembles the same procedure done on the right shoulder pad. First, paint out the bulk shape of the plates and inflat them outwards (**Fig.94**).

Fig 94



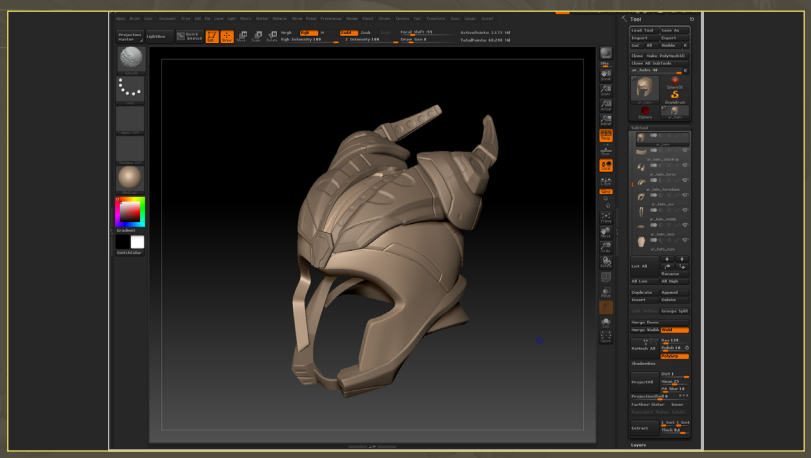
Once this is done, reduce the selection by masking out the lowest level plate and push the new section outwards, repeating the process for the last plate (**Fig.95**).

Fig 95



Taking a step back, we can really see the helmet coming together and how all of the details are working once all of the pieces are visible (**Fig.96**).

Fig 96



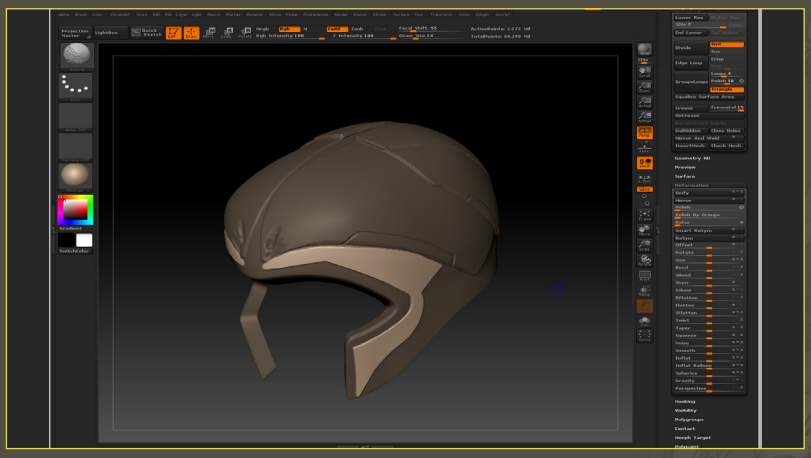


Fig 97

Next, mask out the armor piece that wraps around the brow line and down towards the jaw (**Fig.97**).

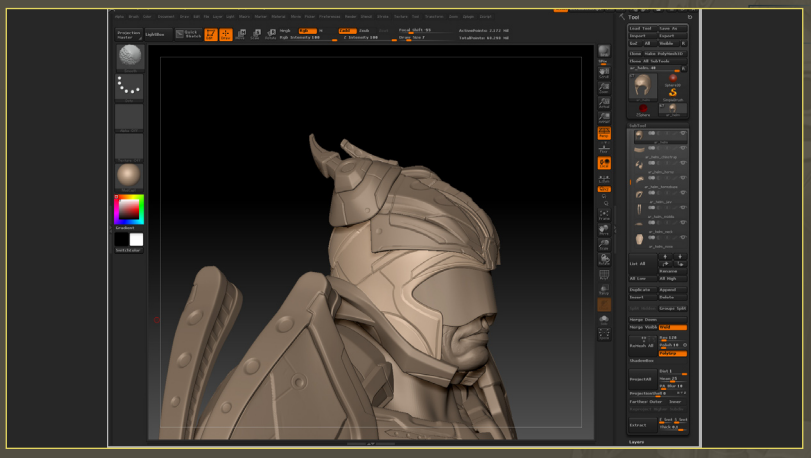


Fig 98

Once all of the panels are sculpted out, give the entire helmet a polish pass by beveling the edges with a flatten brush and strengthening the grooves with a standard brush. At this point you can also add in finer details like seams and bolts, as well as the seam work that spans from the bridge of the nose and goes over the brow (**Fig.98**).

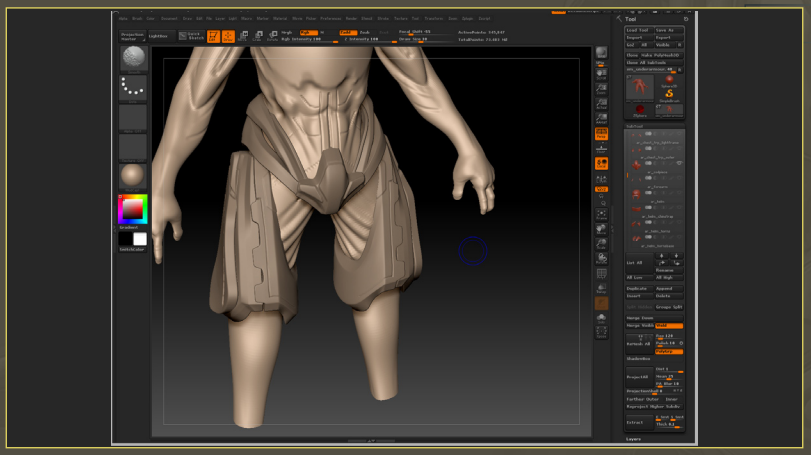


Fig 99

Moving back to the thighs of this character, block out the ribbing hinted in the concept art by running a standard brush, with Lazymouse activated, from the crotch down towards the knee. Use a fairly low intensity here so as to not push the detail out too far (**Fig.99**).

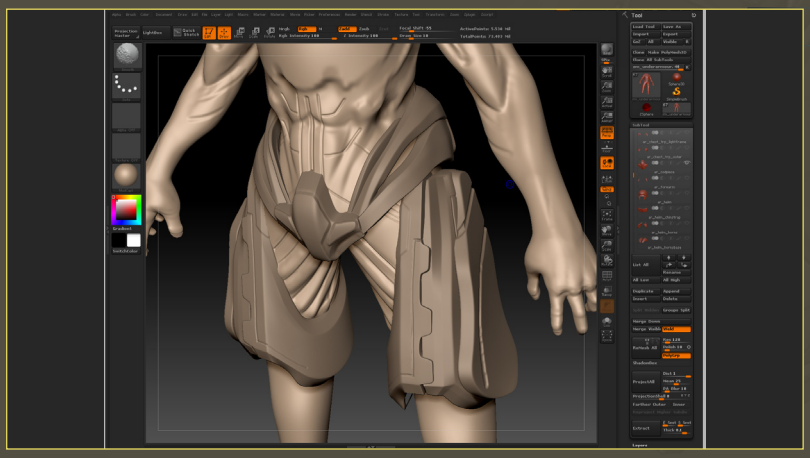
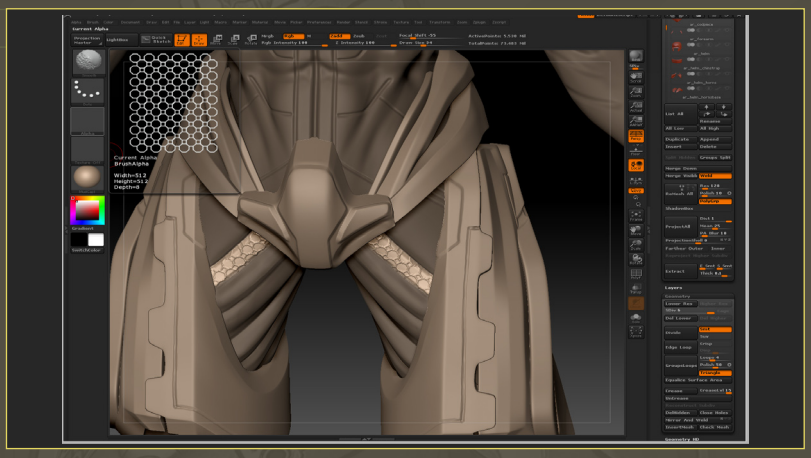


Fig 100

Next, move up in subdivision levels and deepen the creases between these ribs with a higher intensity brush. Also run a flatten brush over the panel closest to the pelvis as this will be a different material (**Fig.100**).

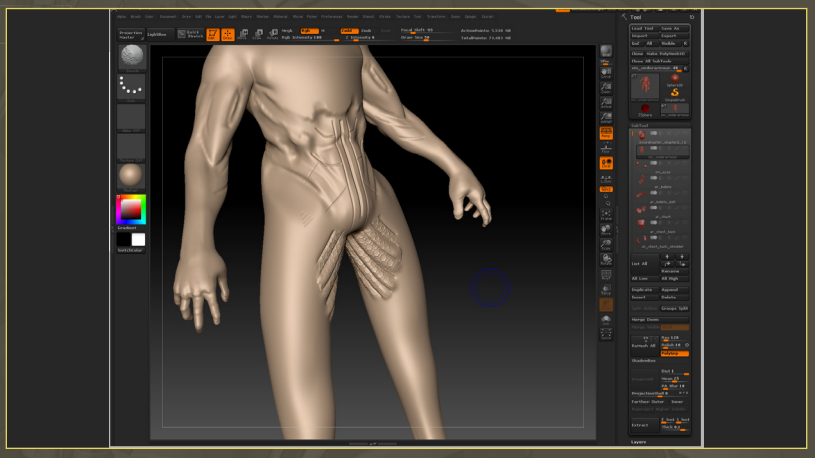
Mask out each rib individually and bring in a custom alpha that consists of connected octagons. Using a DragRect stroke type, drag this detail at a low intensity over the exposed area (**Fig.101**).

Fig 101



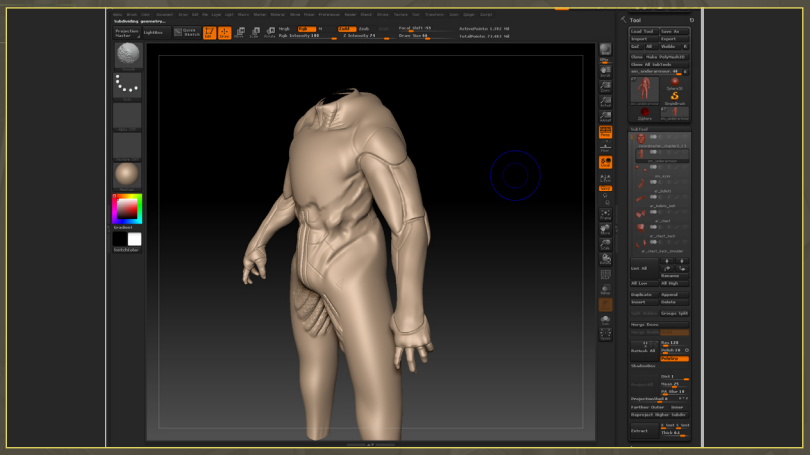
Repeat this process for each ribbed section, smoothing out the area using a low intensity brush after the fact to remove any obvious artifacts. The idea here is to just introduce a new material that will stand out from the metal plates, but not be overly distracting. The webbing also hints to the fact that this area is probably less armored as it needs to be able to move freely (**Fig.102**).

Fig 102



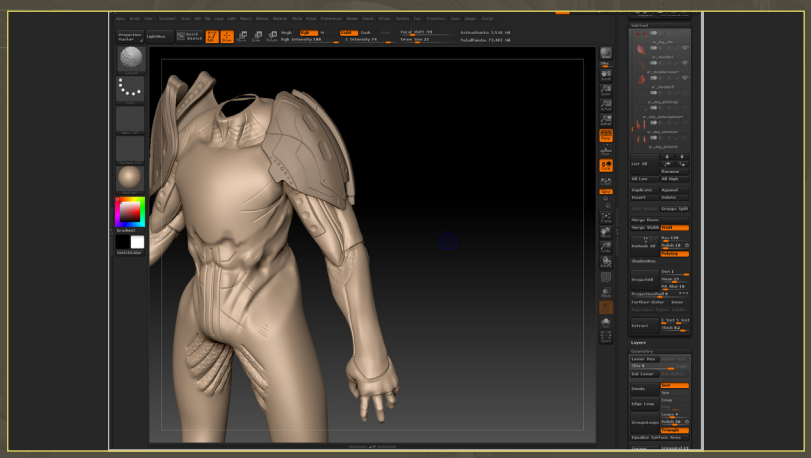
Continuing on with the organic material body armor, most of the muscle detail has been blocked out in our sketch sculpt. Refine these areas by smoothing them out where needed and finally draw in the different sections, which hint towards padding in the suit and construction that allows the human underneath to move around, with a standard brush (**Fig.103**).

Fig 103



Bevel these areas with a flatten brush and refine the seams with a standard brush. After this, incorporate a panel on the bicep (which is indicated in the concept) by masking out a rounded rectangle shape and dropping in port holes with a DragRect brush and circular alphas. Also mash the inner elbow and drag in the webbing pattern we used on the thighs. Reusing this material helps show that it is reserved for deformable areas (**Fig.104**).

Fig 104



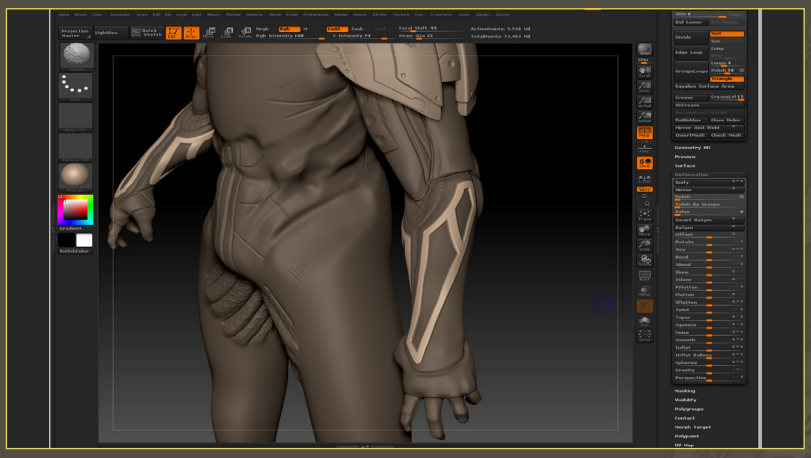


Fig 105

Next, mask out the edging detail on the forearms and inflat them out. For the most part, these details will be hidden by the forearm plate itself, so be sure to double check that the information you're creating will be seen (**Fig.105**).

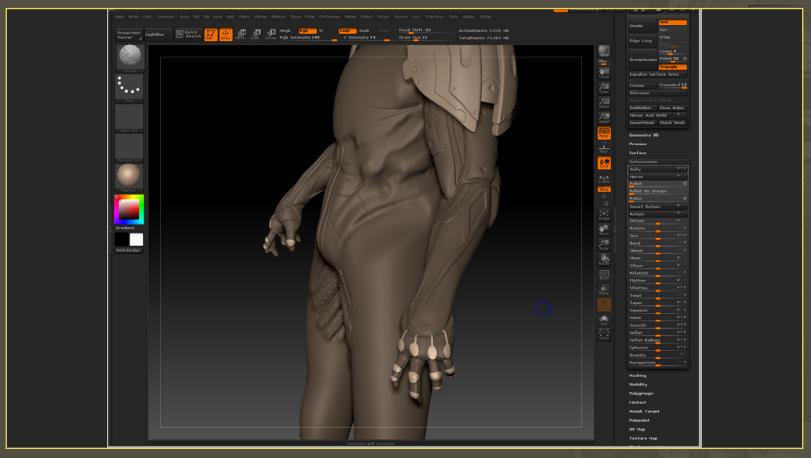


Fig 106

Next, mask out the knuckles and inflat them. This creates the idea that these joints are at least slightly more armored than the basic pieces (**Fig.106**).

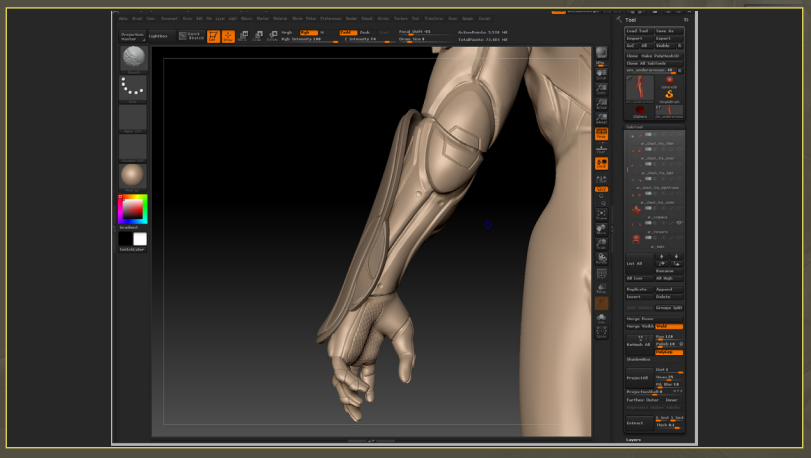


Fig 107

Finally, to finish off the model, mask out the palm and add the webbing patter to this area as this is a thin spot in the armor suit. Also punch up the seams and add some bolt holes showing where the padding could be fastened to a more comfortable layer underneath (**Fig.107**).

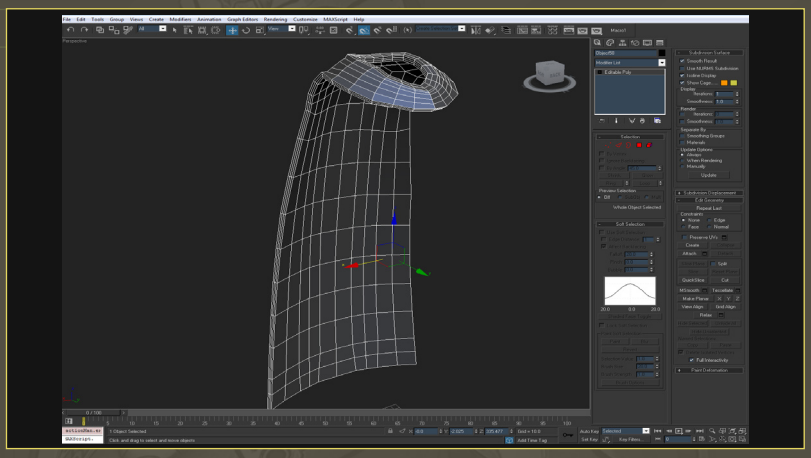


Fig 108

Here we can see the final sculpt all together (**Fig.108**).

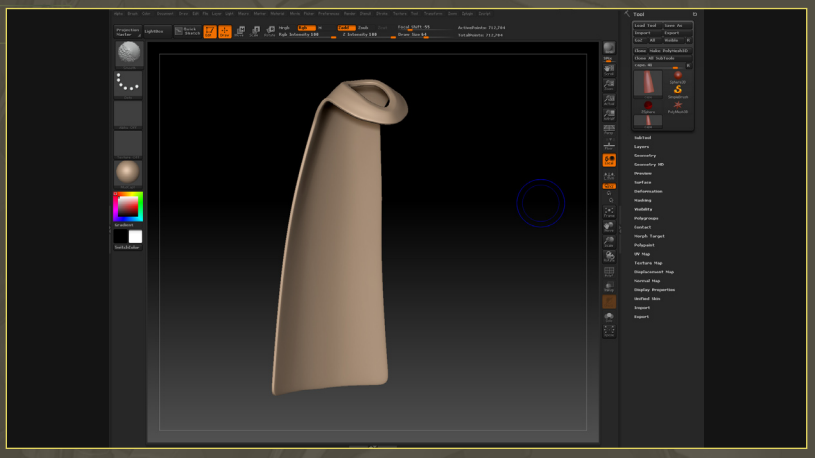
Now, we begin on the accessories. To start it off, make the cape base model. The base model for the cape is fairly straightforward. Using the character base mesh as a guide, create a loop of polygons and work loops out from there to cover the clavicle and work down the back. Remember to curve the cape slightly as it reached the calf area (**Fig.109**).

Fig 109



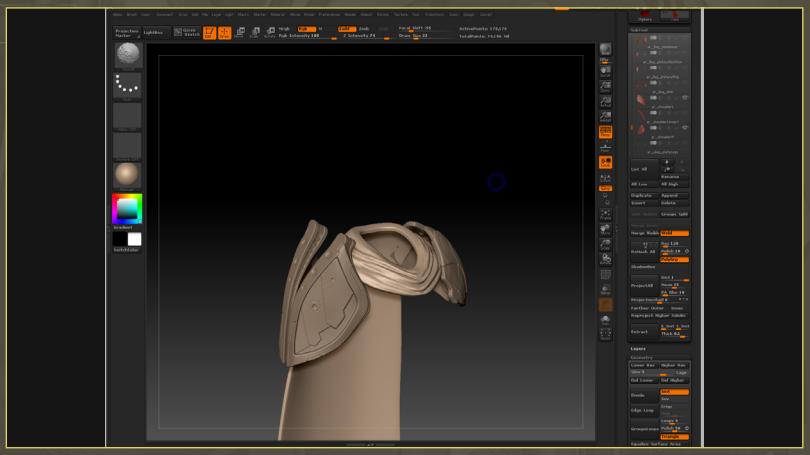
Append the cape model as a separate subtool for the sculpt we've been working on and subdivide it a few times (**Fig.110**).

Fig 110



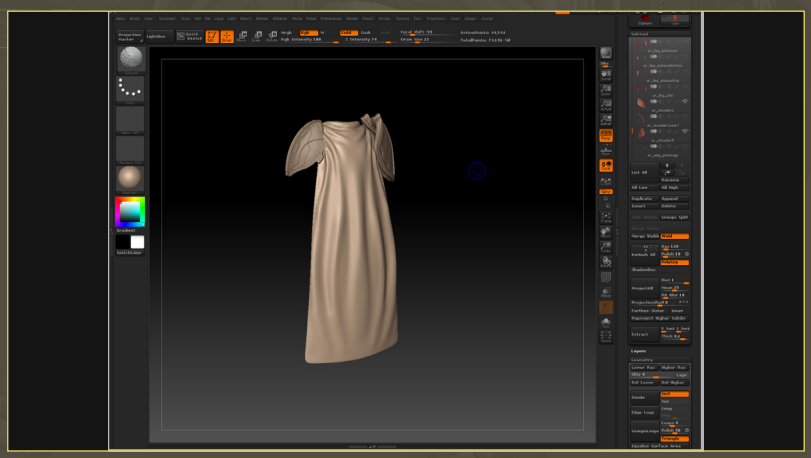
Now, begin working on bigger folds with a standard brush, keeping in mind how the fabric would bunch up around the neck when compressed (**Fig.111**).

Fig 111



Paint in large strokes that are tighter next to the neck and in broader, more subtle strokes towards the bottom. The reason for this is that the fabric would swing more freely if not compressed like it is next to the shoulders and, since the cape will eventually be rigged to animate, we want to have as few wrinkles as we can so that they don't conflict with how the cape would move and compress during animations (**Fig.112**).

Fig 112



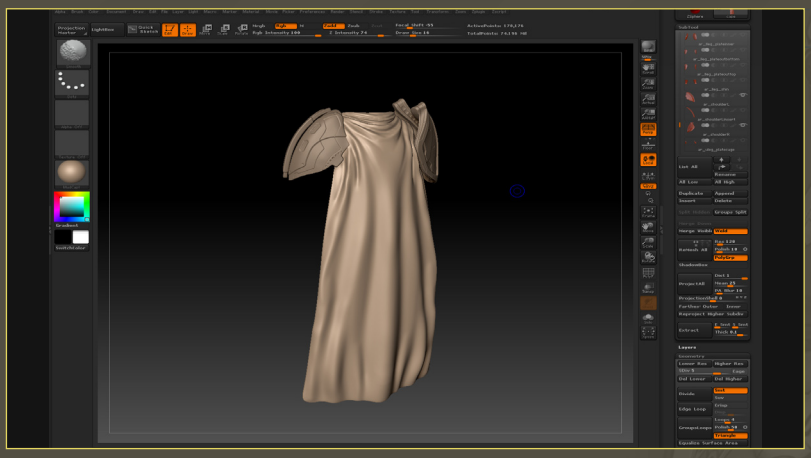


Fig 113

Once the folds are blocked in, increase the subdivision levels and refine the shapes with a tighter standard brush (**Fig.113**).

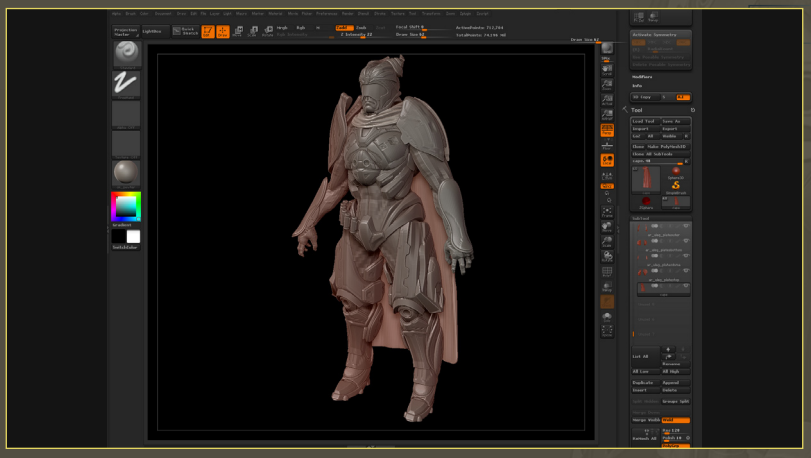


Fig 114

Here you can see how the sculpt will fit the final character (**Fig.114**).

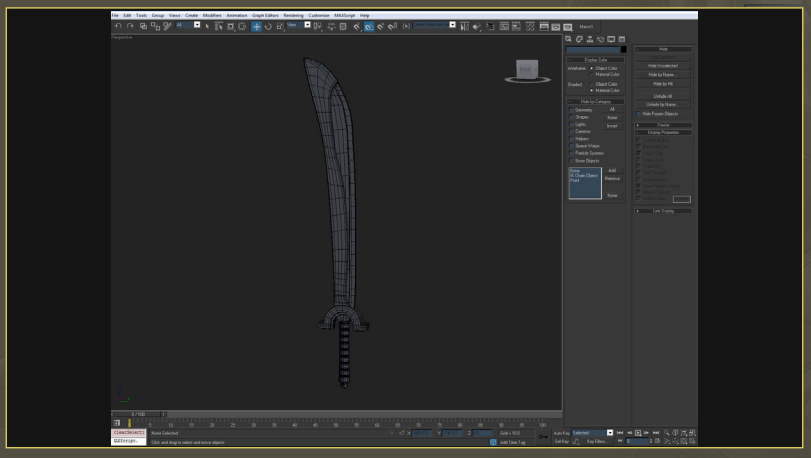


Fig 115

Now we move onto the character's weapons, which include a technologically advanced sword and a smaller gun for ranged attacks (**Fig.115**).

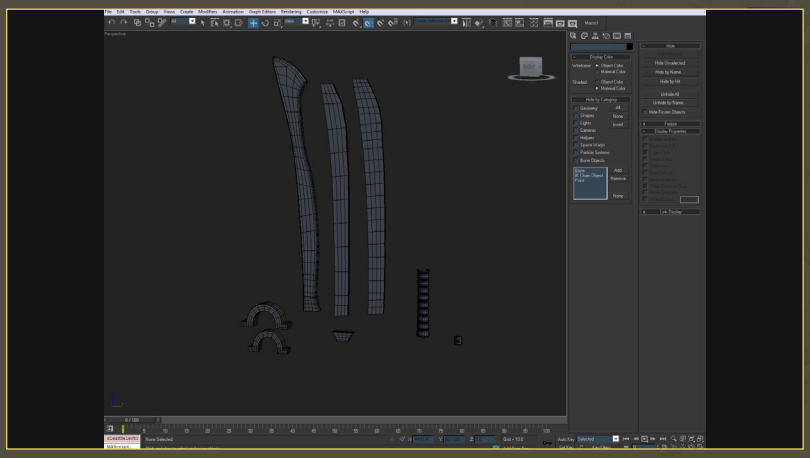
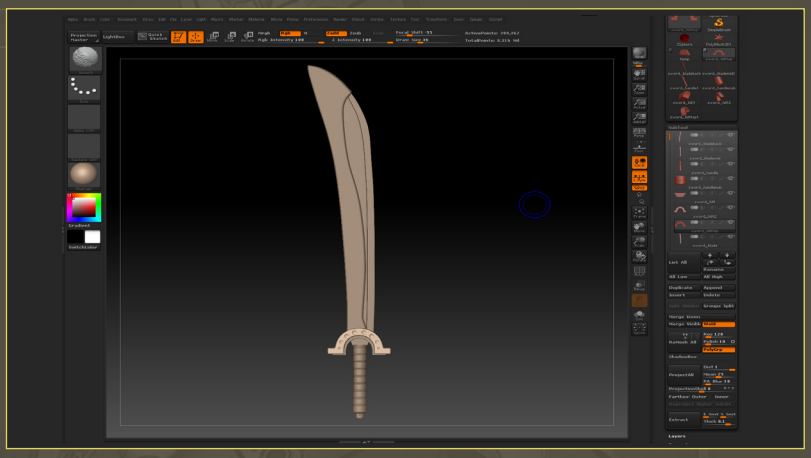


Fig 116

Much like the body armor, you can see that the sword is composed of many different elements. I find that it is just easier to iterate this way if need be, since different portions of the model can be swapped in and out, as well as maintaining edge fidelity since sculpting information won't bleed from one section to another. As you can see, I've tried carrying the armor style over into the weapons to give it a consistent look as if the entire set was issued to this particular warrior (Fig.116).

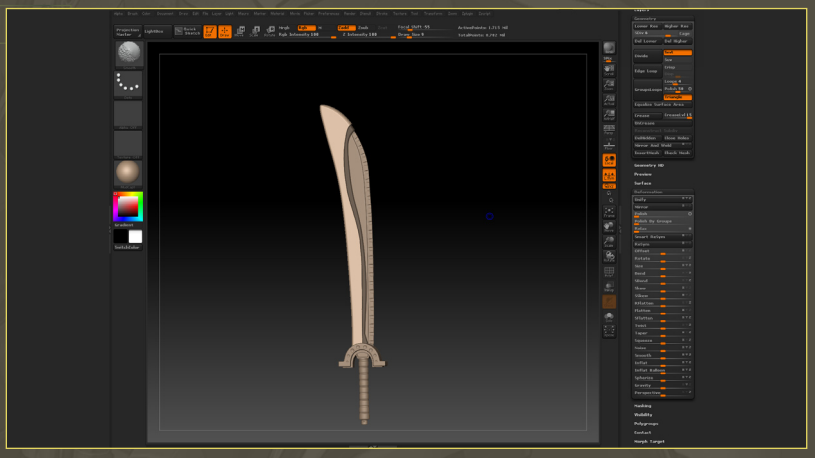
Import all of the separate models as OBJs and construct a new tool file by using the Subtool Master Multi Append feature. Once all of the models are brought in, subdivide them a few times and get to work on detailing up the sword hilt with tapered holes, which can also be seen in armor pieces on the character (Fig.117).

Fig 117



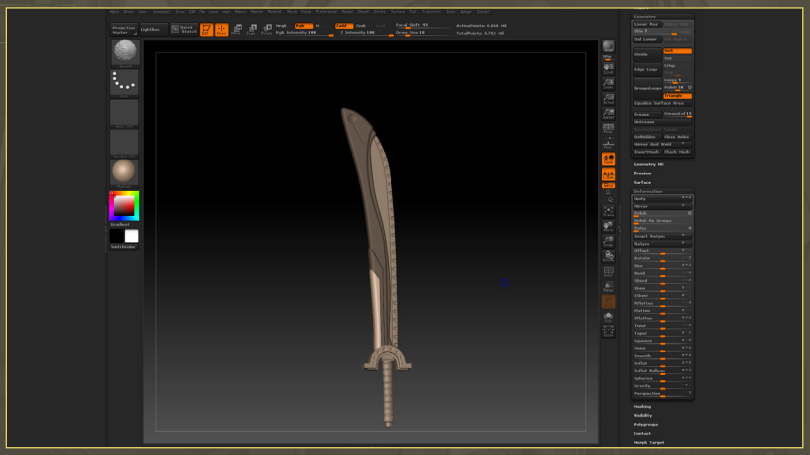
After this, freehand in a seam detail on the hilt and move onto the actual blade of the sword. On this plate, run a Stitch brush over the edge which has a tabbed alpha that will be used to create a serrated blade, which I think makes the blade look more menacing. Next, grab the plate that creates the back of the sword and mask in an insert that will act as a brace for the serrated blade (Fig.118).

Fig 118



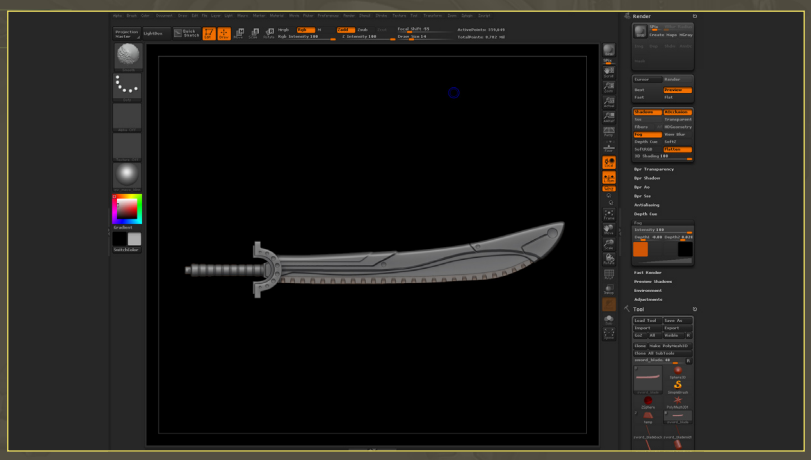
With this same section selected, mask out a layered plate effect towards the hilt and add a few accents towards the top of the blade (Fig.119).

Fig 119



This is the final sword sculpt with a more metallic material (Fig.120).

Fig 120



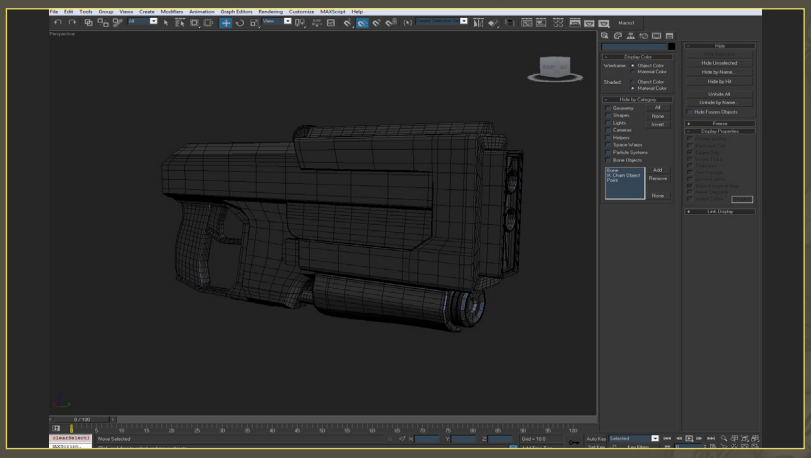


Fig 121

Now we move onto the gun, which is like a heavy duty machine pistol. The idea behind this gun is that it can be handled with just one hand, but also have the option to use the off-hand for stability. I think having a bigger gun that would require two hands would defeat the purpose of the sword and the Swordmaster (**Fig.121**).

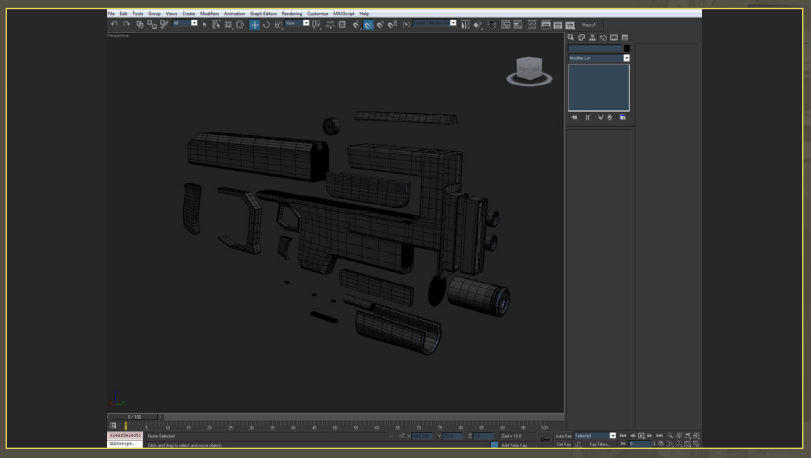


Fig 122

Like the sword and the armor suit, the gun is split up into many different elements which, for the most part, begin in the center and layer out to the top. Most of the shapes are fairly simple geometry and don't get too caught up in finer details (**Fig.122**).

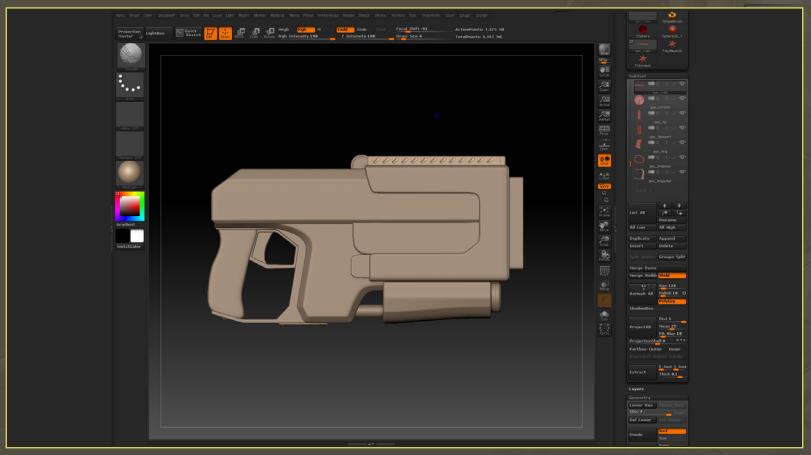


Fig 123

Import all of the models using the Multi Append feature and begin a new sculpt. For both the gun and the sword, you can simply use the character model as a scale reference and handle the weapons as separate sculpt files so as to not bog down the character sculpt.

Begin the gun sculpt by using the stitch brush and a custom alpha, which consists of a rounded rectangle turned 45 degrees and faded to create the vents on the top rail section (**Fig.123**).

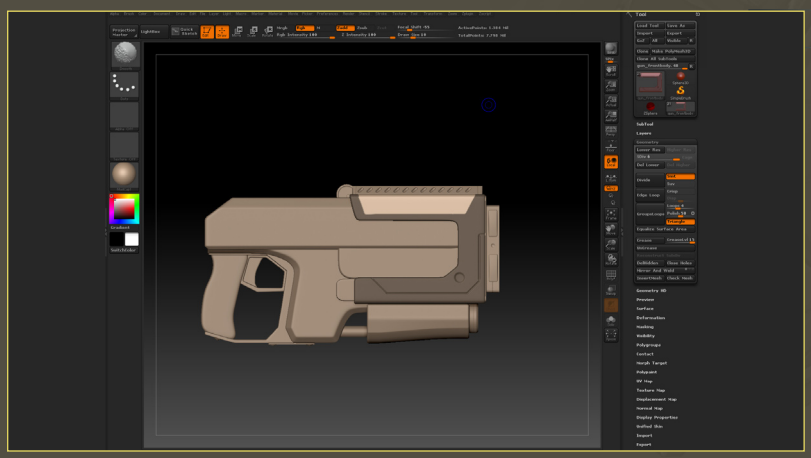


Fig 124

Next, lay down some surface details like seams and bolts. After this begin masking out sections to be pushed in and out of the gun body (**Fig.124**).

Continue on with surfaces details, adding rivets, seams and a serial number plate. Moving on to the gun front grip, mask out sections as I have done and draw the rubber grip bubbles with a Stitch brush to keep the spacing even. Once a stroke with any brush has been started, if

you hold down Shift it will lock the brush and allow you to paint in a straight line. Of course, pressing Shift before the stroke just activates the Smooth brush (**Fig.125**).

Next, drop the model using Projection Master and lay down details such as the top slots and smaller panels. These use custom alphas we have already used and stock alphas from the standard ZBrush alpha library (**Fig.126**).

From here, paint in vents, like on the rail, with a Stitch brush using the same alpha. You can rotate, invert or flip an alpha image in the Alpha tab at the top of the screen. This helps save time as you won't need to alter your alpha in Photoshop.

Moving on to the grip, mask out a section and inflat it with a negative value to bring it more flush with the trigger area. Also draw in a bolt using alphas that we have already created and mask and inflat the rubber grip section of the handle (**Fig.127**).

Finally, add finishing touches like cleaning up seams, the rubber grip and scratches from wear and tear.

This completes the high resolution modeling portion of the series. From here, we will be moving on to the game resolution model and will be covering topology, deformation and polycount (**Fig.128**).

Fig 125

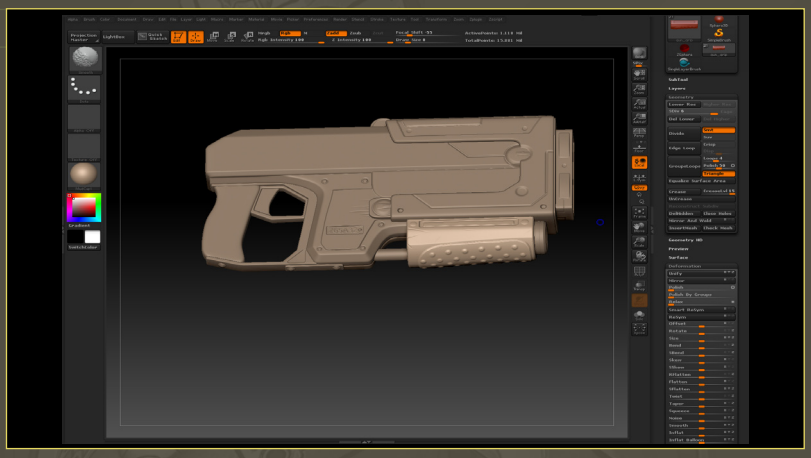


Fig 126

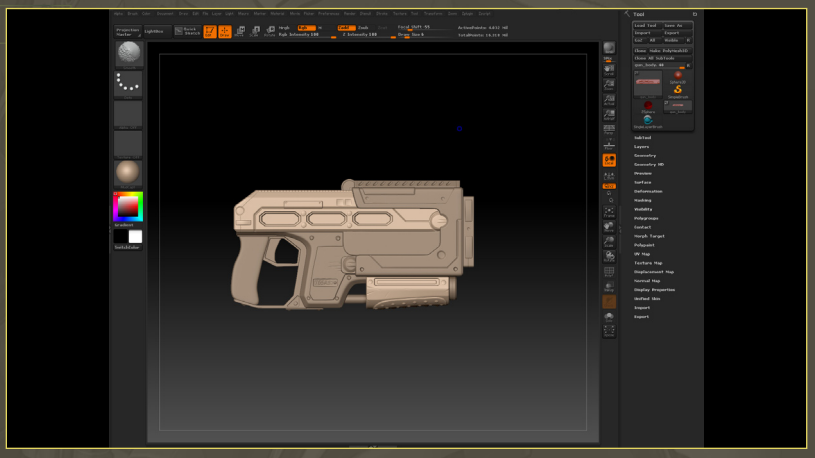


Fig 127

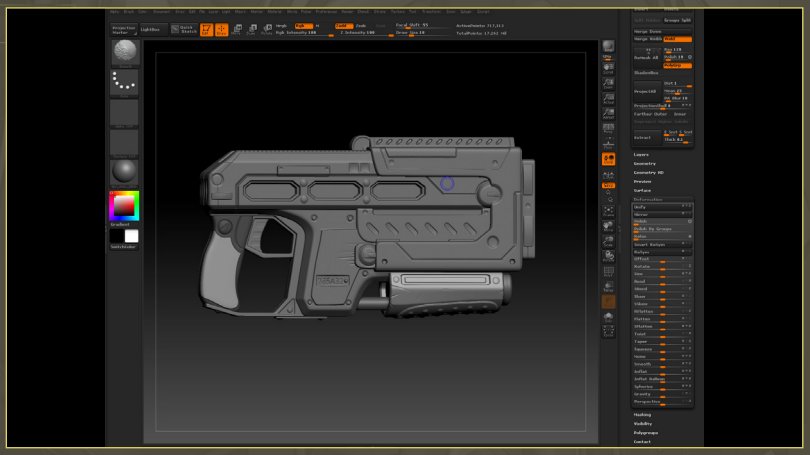
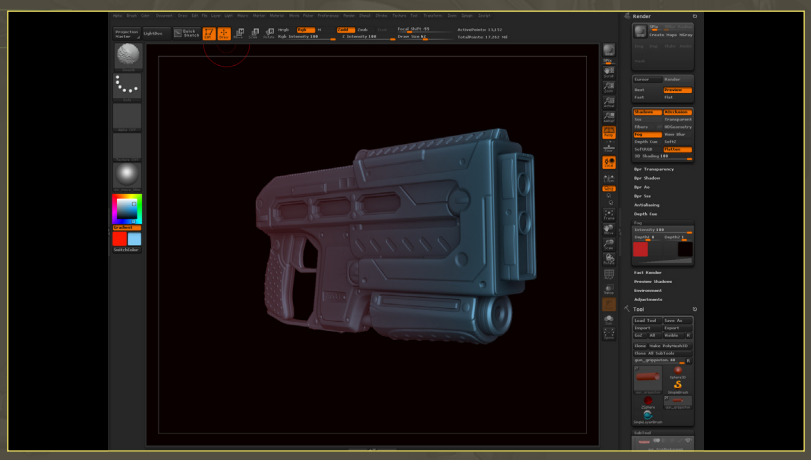


Fig 128



Gavin Goulden

For more from this artist visit:
http://www.gavimage.com/
Or contact them at:
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SWORD MASTER 2



Chapter 2 - Sculpting

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Chapter 5 | February Issue 078
Texturing

Chapter 6 | March Issue 079
Rendering

CHAPTER 2 - SCULPTING

Software used: Maya

INTRODUCTION

In this portion of the series we are going to dive into the detailing phase of our model. We'll be creating a sketch sculpt in ZBrush, hard surface modeling, detailing in ZBrush, organic sculpting and even covering the creation of our character's accessories: his trusty sword and gun.

With our model exported from Maya as an OBJ, we can simply import it into ZBrush by navigating to Tool > Import and selecting the face base mesh. You can also use Subtool Master, as I will later on, to import a massive amount of models all at once (**Fig.01**).

Fig 01

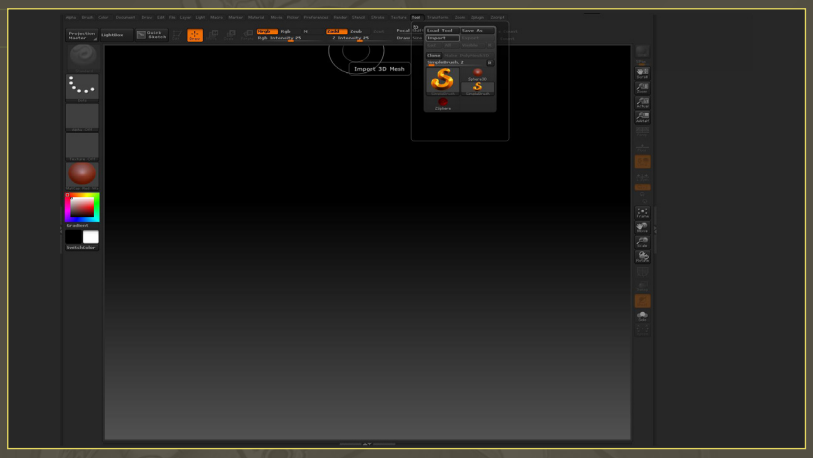
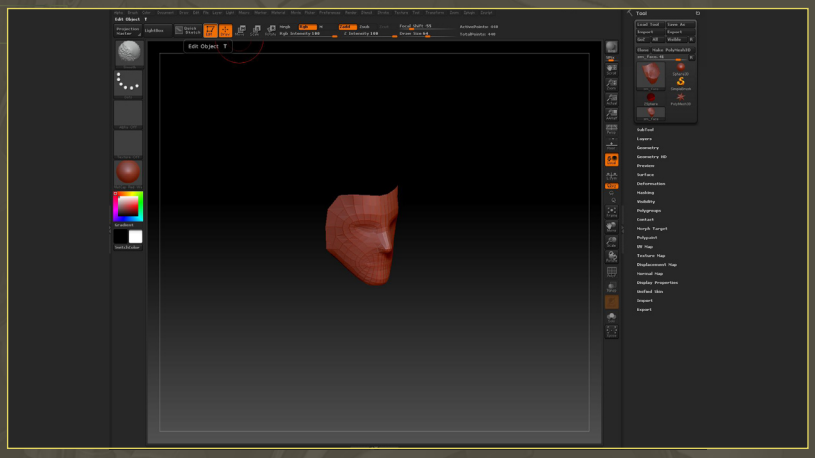


Fig 02



Once the model is imported into ZBrush, it won't actually be drawn in 3D space. You will need to click and drag the model on to the canvas and then enable Edit. This allows you to alter the model further; otherwise it will simply be a 2D image on a canvas.

I also have a few custom settings in my ZBrush. I use the default layout, for the most part, and have a set of alphas and matcaps that I use on a regular basis, which are placed into ZBrush's start up folder. This is just to save me time from loading the same material every time. I also have the brushes I use set to hotkeys from 1-6. These can be set by opening the Brush panel, pressing Alt + Ctrl and clicking on a brush icon. For example, I have Standard set to 1, Flatten set to 2, Pinch set to 3, Claytubes set to 4, Move set to 5 and Stitch set to 6. Generally, any brush I use is set to Add, using Alt to activate the reverse option such as Subtract (**Fig.02**).

Fig 03



Fig 04



After dividing the mesh a few times by pressing Ctrl + D (you can also manually add divisions in the Tool menu) begin roughing out the facial features using the Claytubes brush. I generally sculpt in symmetry by pressing X. If

you navigate to Transform you'll be able to set the axis, or enable multiple axes, to be affected by symmetry. By default this is set to X. At this stage don't be concerned about details; the goal here is to block in low frequency form information that can be read from far away (**Fig.03**).

Next, bring in a set of eyeballs to help keep that area crisp. This is simply two spheres that are mirrored on the X axis. Bring them in by first appending a dummy tool in the Subtool panel, then manually importing the OBJ via the Tool menu. I like to keep these as separate models within ZBrush to keep the sharp line of the eyelids intact against the eyeball. As we'll be altering that area quite a bit it's nice to have the eyes just retain their shape. Plus, it acts as a nice guide for eyelid volume and shape.

Here, begin refining the shapes more by bringing in sharper details, like the lip edges, with a standard brush (**Fig.04**).

More refining of big shapes here with a standard brush. I tend to over-sculpt areas and tone them down during the polishing stages; this can specifically be seen in the eye and mouth corner areas. If you sculpt too much, you can easily smooth out the area by holding down Shift and brushing over the trouble area (**Fig.05**).

Define tighter details, but still keep it at a low frequency level and avoid going overboard with wrinkles and surface details. Then begin refining the eye area more and sharpen up the nasal folds (**Fig.06**).

The mouth is a touch too wide for the character's face. Generally the corners of the mouth line up with the pupil of the eye. So let's drop the subdivision levels to easily alter a larger space. This can be done by simply pressing Shift + D – do this and you'll see your model become lower resolution. With the Move brush selected (not the Move Transpose tool) bring the mouth width in (**Fig.07**).

Fig 05



Fig 06



Fig 07



Fig 08





Fig 09

Now move into higher frequency detail, nothing as fine as skin pores, but getting finer details like working the edge of the lips and the flesh of the cheeks (**Fig.08**).

I find it really helps to sell an organic piece, especially a human face, by contrasting hard edges against an otherwise soft object. For example, in this step I've flattened the cheekbones, the eyelids and the bridge of the nose by using the Flatten brush. This helps the details in the face to really pop out by avoiding having all of the features form one continuous "blob". Unless you're going for a very stylized look to your character, I would keep this sort of detail to areas that would have bones closer to the skin. Meaty areas, like the chin or nasal fold, may look odd if they are given a sharp treatment especially when deforming during animations as you will be stretching and squashing a surface that looks stiff (**Fig.09**).



Fig 10

Add sharper edges at a lower level at the tip of the nose and the edge of the lips. Here, also add slight surface variations with a standard brush at low intensity. This helps during lighting to show that the skin isn't a perfectly smooth surface. Adding slight depressions, like on the chin and forehead, also shows where skin can bunch up and compress without baking too much expression in a sculpt that's intended to be fairly neutral (**Fig.10**).

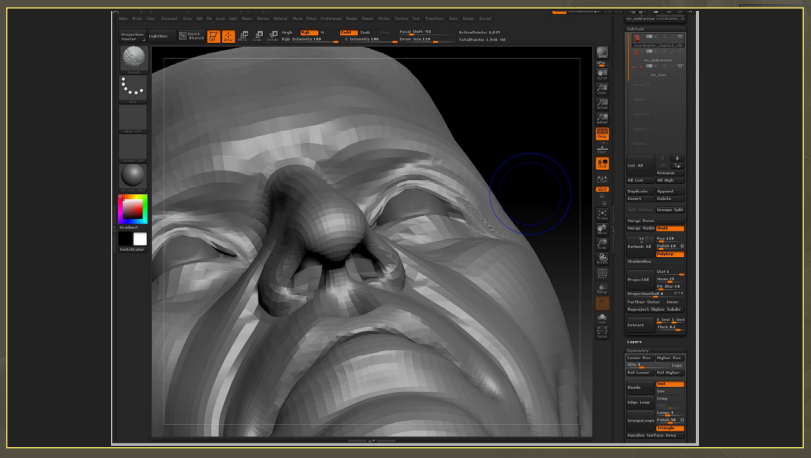


Fig 11

To help define the nostrils better, drop the subdivision levels down and move the tip of the nose inward to give the nose a natural flare. Also push the nostrils themselves in using a standard brush (**Fig.11**).



Fig 12

Now we finally get into the finer details of the skin. Try not to go overboard with this as it can make a character look older than intended and can make a normal map bake look muddy. There is only so much detail that can be translated in a normal map as it is all per pixel and dependent on your texture's resolution. Lots of pores and wrinkles can all blend together

during texture baking and cause the final output to look lower resolution than it actually is. So, for the most part I like to keep my models clean and isolate detail areas.

I have a few skin pore brushes that I use for character skin. This is made from a more or less black texture with white dots scattered about. Using the Claytubes brush at a very low intensity, paint a few strokes over the peak areas of the skin – like the cheekbones and highest area of the cheeks. Also lightly define the eyebrows with a standard brush, focusing on a few clumps of hair and being sure not to go overboard with the depth (**Fig.12**).

Next, add stubble by following the same steps just in Add mode and targeting the beard area. Again, be sure not to go overboard here as the end result can end up looking more like facial scaring rather than a five o'clock shadow. You can also add small details to help throw the symmetry of the face off, such as moles and bumps in the skin (**Fig.13**).

Here you can see the finer details I've added, such as a minor scars, blemishes and wrinkles from aging (**Fig.14**).

There is a detail in the mood concept painting for this character that I had originally thought was a battle scar. I thought this would be a cool touch for the character to show that he's fought before and lived to tell the tale. So, using a standard brush, let's cut into the skin and flatten the edges to make the cut not as sharp, to mimic skin healing in real life. Also add smaller scars coming off of this main cut to show where skin would have healed awkwardly (**Fig.15**).

Just like the eyeballs, import the underarmor base mesh as a subtool of the face sculpt. In the coming steps, we'll be sculpting out an armor design, practically sketching out the armor in 3D space. Once this is complete, we will build hard surface armor chunks around this sculpt only to bring them back into ZBrush for surface

Fig 13



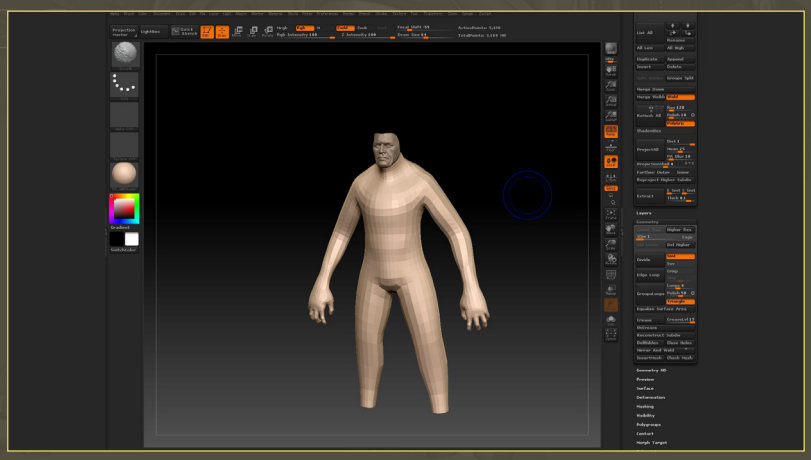
Fig 14



Fig 15



Fig 16



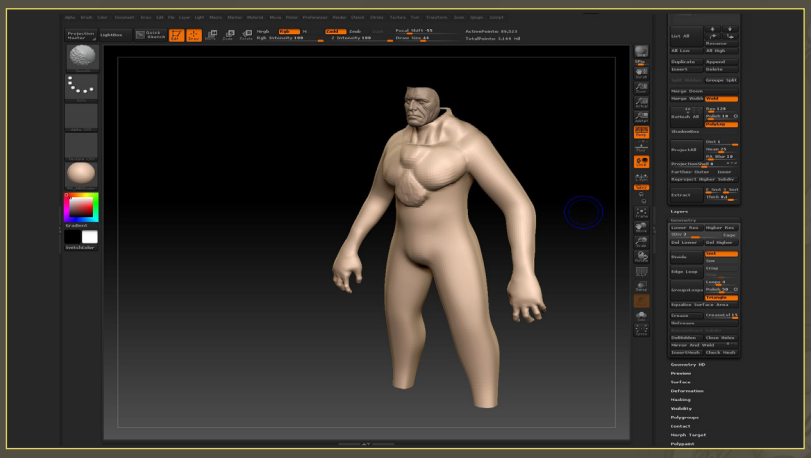


Fig 17

detailing. I find that this method provides a quick way to prototype ideas or work out complex shapes and is much more forgiving than traditional modeling techniques (**Fig.16**).

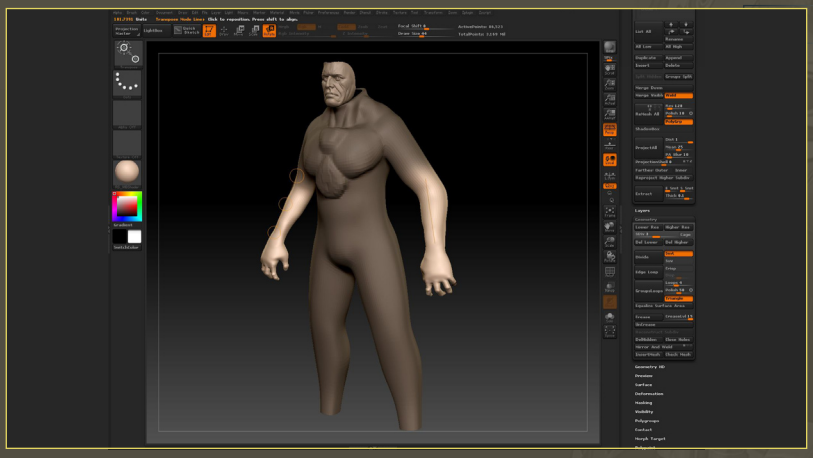


Fig 18

Much like the beginning stages of the face, start blocking in the chest armor pieces and the connecting armor chunks that guard the sternum and clavicle. The main priority is to just rough out the form of the armor plates indicated in the concept drawing. There is no reason to worry about how smooth the surfaces are as we will be crossing that bridge when we build the armor plates for real (**Fig.17**).

At this stage, I'm realizing that the arms are a touch too long, which can easily be fixed with the Transpose tool. First mask out the non-offending areas by holding down Ctrl, which activates the Masking tool, and paint over the body. Holding Ctrl and clicking on the model will blur the mask. At the top of the screen, clicking Move, Scale or Rotate will activate the Transpose tool.



Fig 19

In this case, I'm using a mixture of Move then Rotate. First, click the root of the deformation and then the effector, much like a bone for animations. After this has been set, move the area up by clicking the middle circle and dragging it up some. Do the same in Rotate mode to correct the orientation of the arm (**Fig.18**).



Fig 20

After this, begin blocking in the pelvis armor pieces with the Claytubes brush. I find marking out the two extremes of the torso helps visualize where the limits of the midsection will be (**Fig.19**).

Now start blocking in the midsection/rib plates as well as the muscle definition for the arms and hands. You can also run a flatten brush over some of the edges, especially around the pelvis, to get rid of the blobby look (**Fig.20**).

Now we're going to move onto blocking in the leg armor pieces, which, I think, is the most complicated section of the armor suit as there are many different "organic" metal shapes overlapping one another. I would suggest moving up a subdivision level at this point and flattening out broad edges with the Flatten tool, using a square alpha to give a chisel-type effect. This helps make armor layers pop out from one another, which is most noticeable in the upper leg armor and will help define boundaries when we crunch the sculpt down for later use (**Fig.21**).

Fig 21



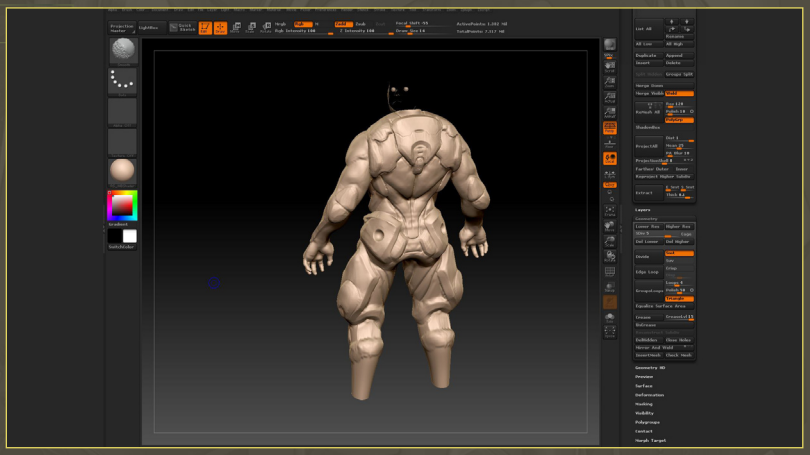
Refine the plates more, running over the separation areas with a standard brush and smoothing out trouble areas. Also quickly rough in areas like the arm plates, the abdominal muscles and armor plate details like bigger seams (**Fig.22**).

Fig 22



Now we want to carry this method over to the back panels of the character's armor suit. Focus on the main pieces, such as the center area and the overlapping shoulder blade pieces. You can rough in the back muscle details, but we will ultimately be tackling that in the final sculpt as one of the organic pieces like the arms and stomach. All of these pieces, like in the previous step, can simply be created by building up forms with the Claytubes brush, smoothing out trouble areas and flattening edges to give a sharper edge to the armor plates. Any surface detail at this point is basically just for visualization sake and will be tackled in the final sculpt (**Fig.23**).

Fig 23



Refine the shapes, deepening dividing lines between plates that will be built out in 3D as separate models and sharpening edges up for better compression. Like the back armor, any surface detail is just to help visualize what the final version will look like (**Fig.24**).

Fig 24



Next we are going to drop the overall polycount of the sculpt so that Maya will be able to handle the model better. To do this, I recommend using the Decimation Master plugin provided by Pixologic. With the body model activated in the subtool panel, navigate to Zplugin > Decimation



Fig 25

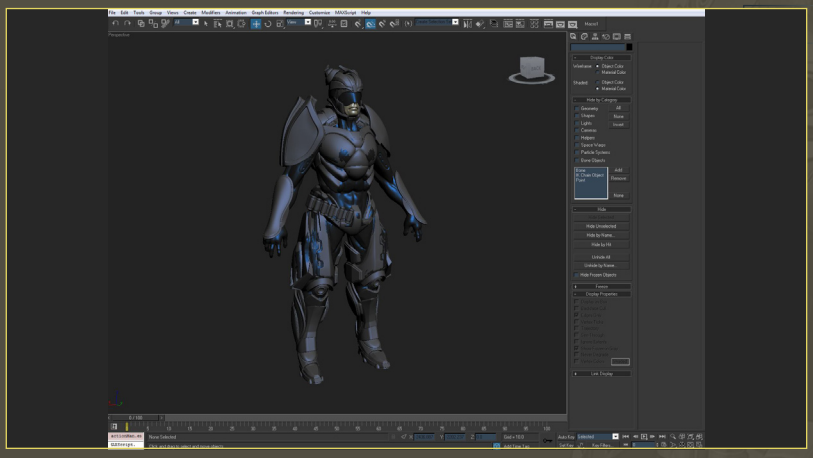


Fig 26

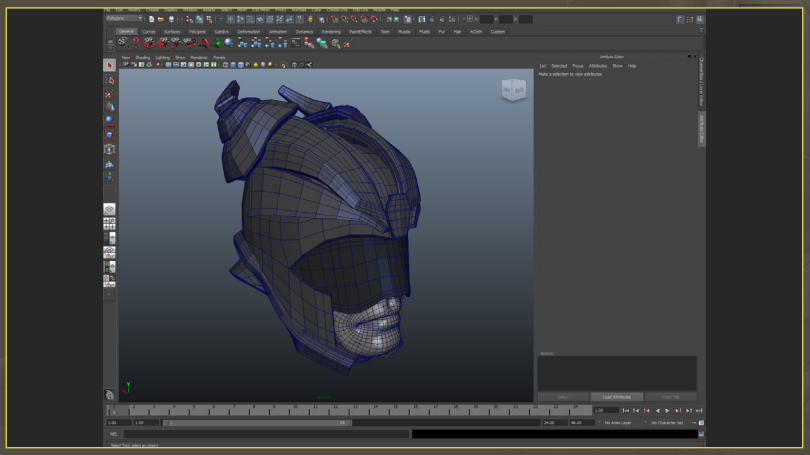


Fig 27

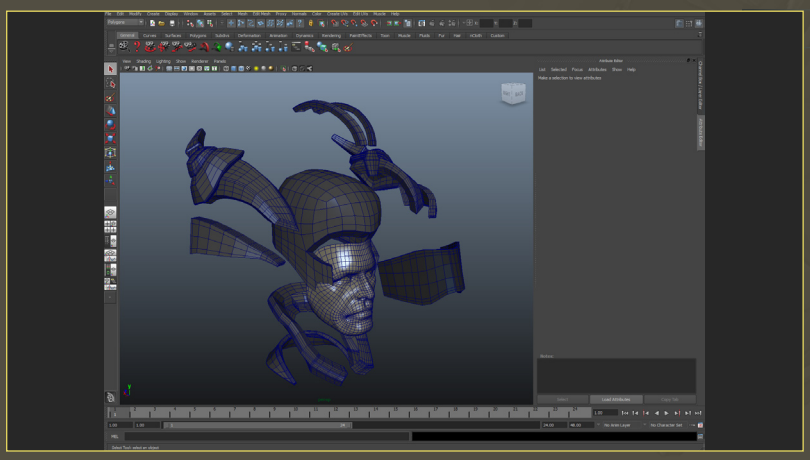


Fig 28

Master. Here you will set the percentage that you would like to reduce your model by. You will need to select Preprocess Current and then Decimate Current. If you enable wireframe mode by clicking the PolyFrame icon on the right side of the screen, you should see the tool become lower resolution. The difference between this and just simply lowering the subdivision levels is that Decimation Master will retain details as best as it can while optimizing the rest of the mesh. Subdivisions are broader changes that can lose a lot of detail in the process. As a note, this will kill off any subdivisions you have so it is recommended that you save a backup copy of your model just in case.

You can repeat this process until the model becomes a resolution that is acceptable for your machine and 3D viewport (**Fig.25**).

Export this new model as an OBJ and import it into Maya.

In the following steps I will be covering the armor pieces by sections and breaking down the different elements involved. The idea here is that I create a plane, like how we began the original organic base mesh in the first chapter, and essentially trace the armor plates that we sketched out in ZBrush. In this step, you can see the final true base mesh assembled together (**Fig.26**).

Starting with the helmet, you can see there are many different armor plates causing a layer effect. We want to sculpt in many of the tighter plates and surface detail, but keep the hard lines from the bigger plates that overlap on top of the head, the bridge of the nose and the antennas (**Fig.27**).

As you can see, most of these pieces are fairly dense and have evenly distributed polygons for cleaner sculpting. Most of the sculpting performed on these pieces will be surface details such as bolts, seams and other grooves. For each element pictured here, a separate OBJ file

will be exported in its “assembled” position, of course. For example, the visor, helmet base and antennas will all be separate files going into ZBrush (**Fig.28**).

Next is the chest. A key thing to notice for the armor, I think, is that the entire suit is practically symmetrical, excluding a few extra details like the bullet belt near the waist and the shoulder pads, which add a natural asymmetry to the design. This makes our lives much easier as we can basically model one half of each piece and mirror it on the X axis like we did in the first chapter (**Fig.29**).

For the chest you can see many different overlapping elements that I feel are necessary to keep the hard edges intact. We’re focusing on the bigger, bolder shapes of the actual armor plates and will tackle surface details in ZBrush. A good rule to follow, I feel, is that if the model would be a separate piece in real life, it should be separate in the base mesh. Indents and ribbing can easily be added in ZBrush, as you will see in later steps (**Fig.30**).

The back armor focuses on bigger pieces, overlapping to create a faux shoulder blade look. For the moment we’re going to leave the lower back exposed and tackle that in the sculpt. In the final, rigged product we’ll want most of the midsection exposed/deformable so that the character can naturally bend. This would be a tough sell if the entire back were armored, so we will sculpt a spine protector into the under armor (**Fig.31**).

The back armor has a few interesting points in the design, such as the subtle lip on the side of the main center piece and the main shoulder blade piece, which has a less rigid, more organic shape that conforms to the shoulder blade (**Fig.32**).

Fig 29

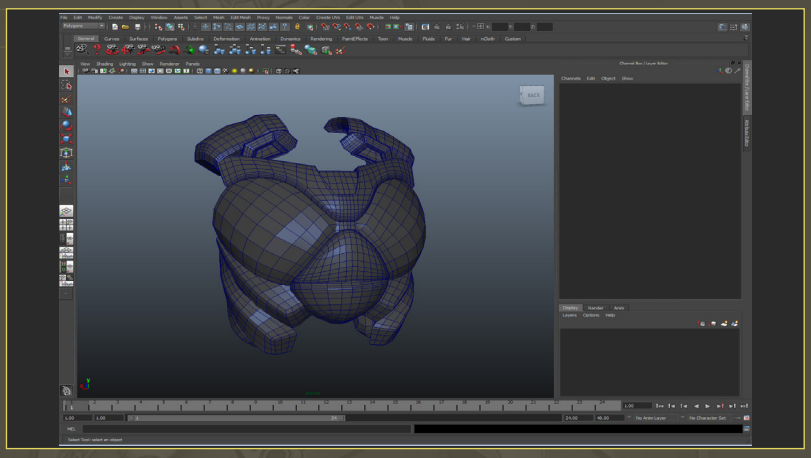


Fig 30

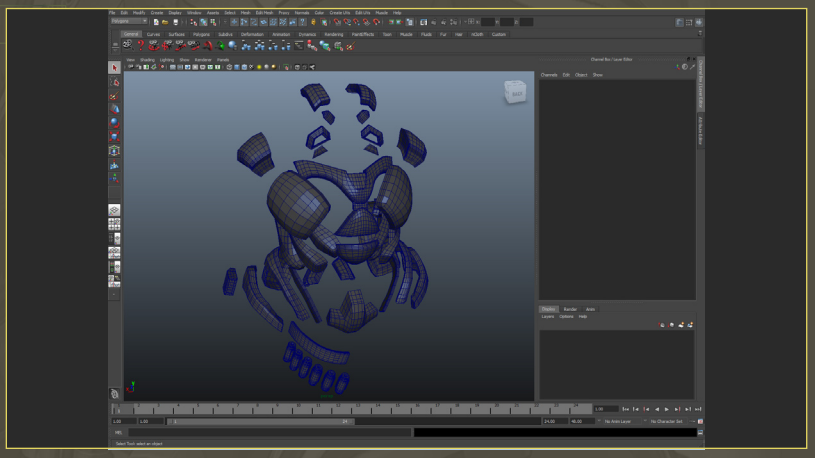


Fig 31

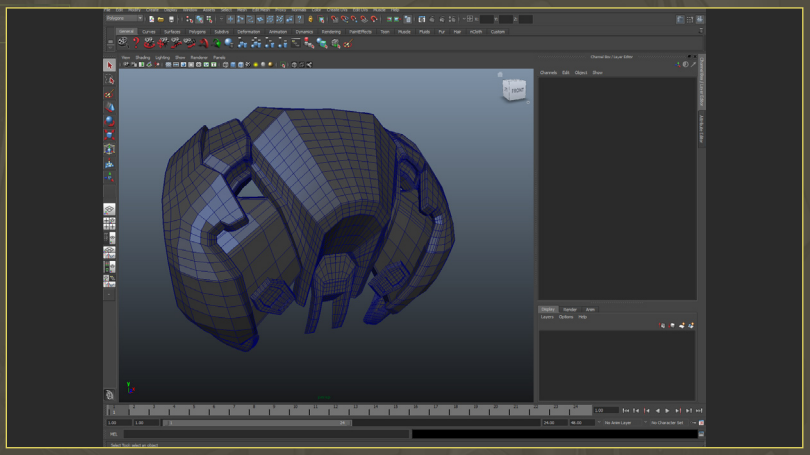
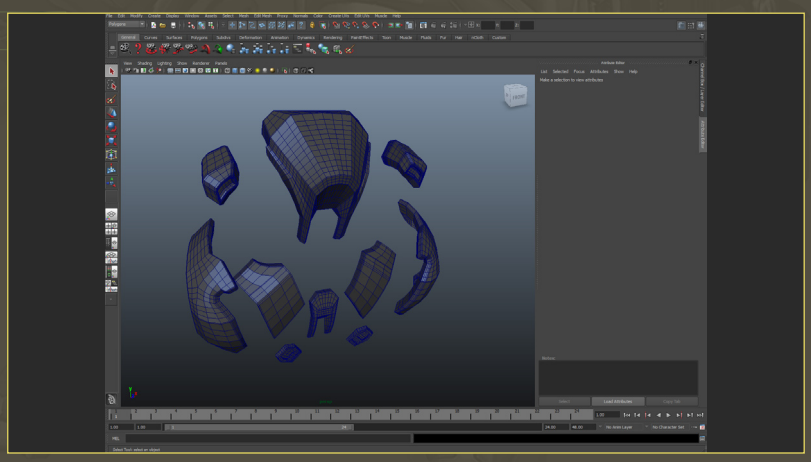


Fig 32



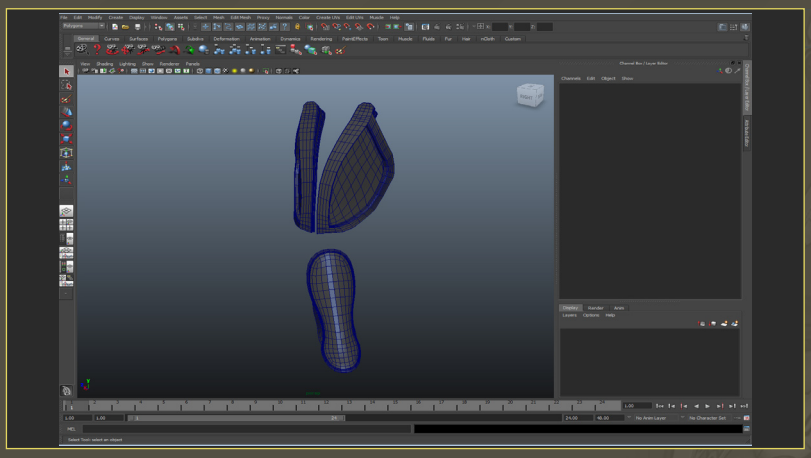


Fig 33

The right shoulder pad has a very interesting shape and is mirrored right down the middle, assuming that some form of connector is on the under armor For the shoulder pad itself, we're going to model in the strong recess and tackle the finer details in ZBrush (**Fig.33**).

The shoulder pad is simply two halves that will be exported as one OBJ into ZBrush.
The forearm guard is a more organic, almost peanut-shaped, armor plate that conforms to the character's forearm. There are also two panels that hang down from this piece, almost as if they are grabbing onto the arm. For the forearm plate, I've decided to model in the rim, but this could also be done in ZBrush.

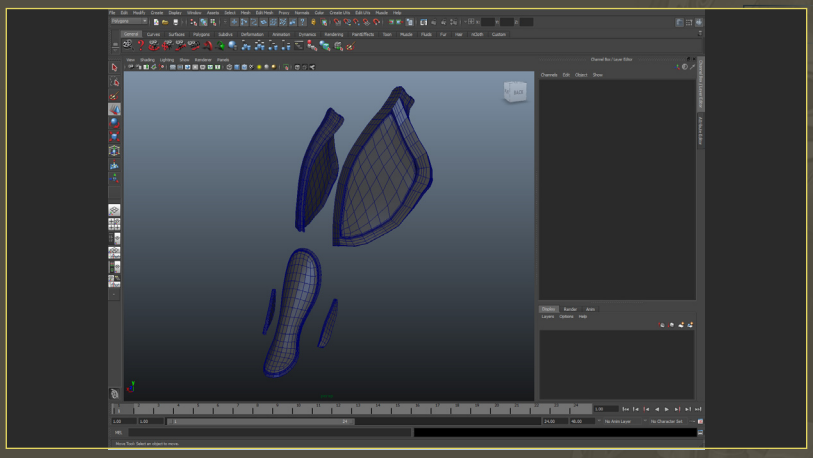


Fig 34

Mirror the forearm guard and its pieces over to the left arm and then export it as one piece (**Fig.34**).

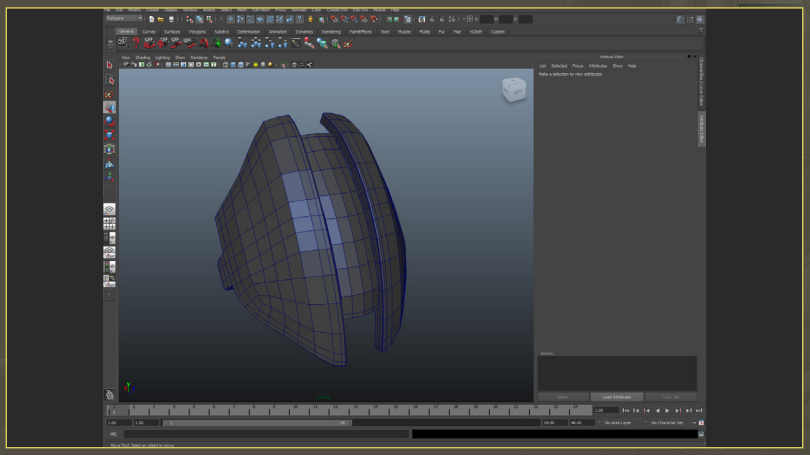


Fig 35

The left shoulder is a fairly simple shell split down the middle, much like the right side and as a middle insert covering the deltoid muscle (**Fig.35**).

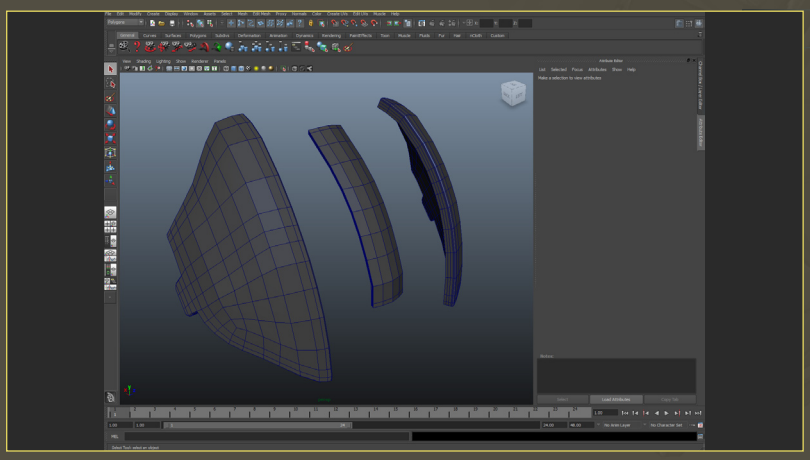
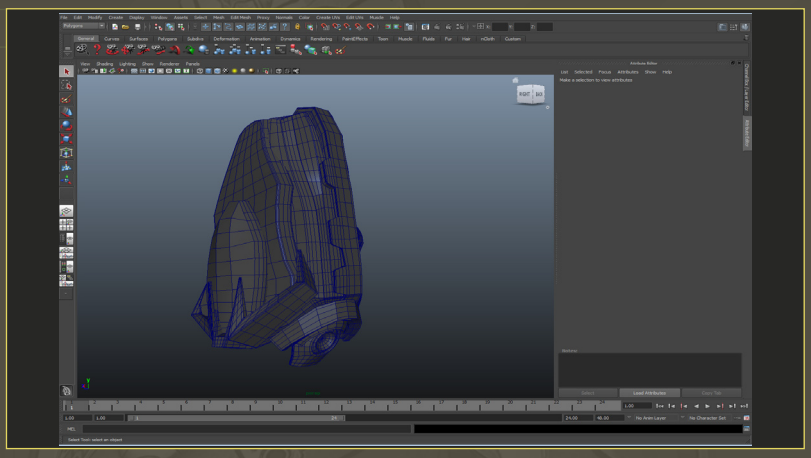


Fig 36

I've decided to model a section that would mimic a connection point as it gives an opportunity for interesting detail. Even though we won't see and probably won't touch the underside of the armor plates in the sculpt, it's good practice to model it in as the final, game resolution model will need that geometry to make the shoulder pads not look paper thin (**Fig.36**).

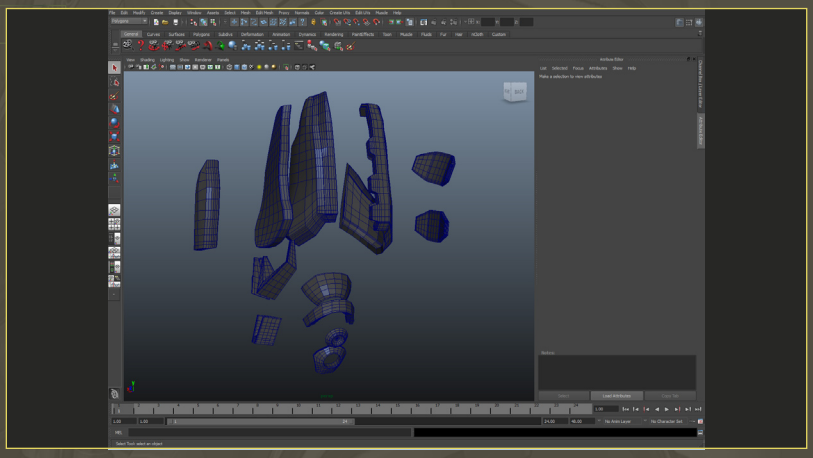
As mentioned earlier, the upper leg armor is probably the most complicated section of the armor suit due to its overlapping, intricate plating. As you can see, there are multiple organic metal pieces, curving inward as the armor nears the pelvis. There is as a plate that wraps around the leg, with tabs, connecting it to the outer leg sections (**Fig.37**).

Fig 37



We benefit greatly from simply modeling these sections as separate elements. Once blown apart, you can see the many rather simple pieces combine into making a fairly complicated piece (**Fig.38**).

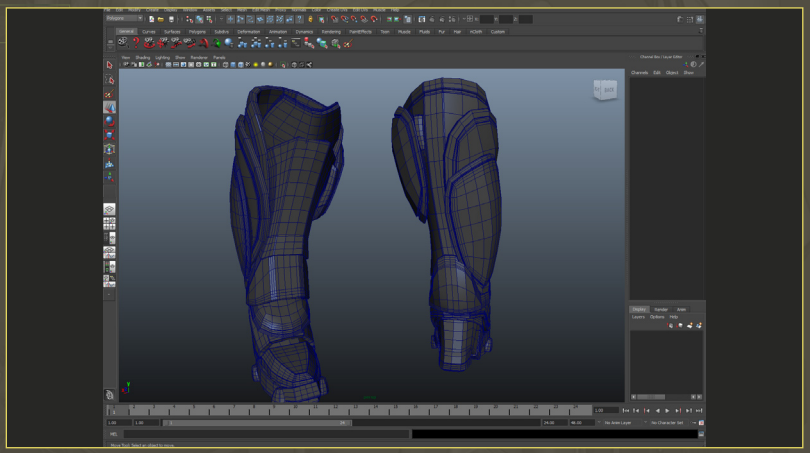
Fig 38



The last section is the boots for our character. As you may have noticed, I haven't bothered sketching this section out in the sculpt as I have a pretty good idea about how the model is going to come together (**Fig.39**).

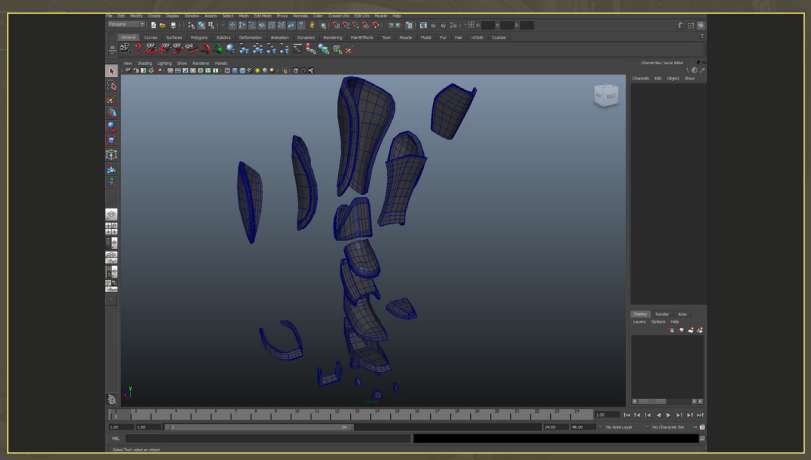
The boot is mostly a skin tight armor plate that has multiple shells layering outwards from its core. For deformation purposes, we want to keep the ankle fairly flexible, so cap off the ankle with a brace which will allow the foot to move freely come animation time.

Fig 39



During the entire modeling process for these pieces, it's a good idea to toggle between subdivision levels to see what the model will look like once subdivided in ZBrush. Ultimately, though, you want to export all of the pieces at their lowest subdivision level (**Fig.40**).

Fig 40



Export all of the models as OBJ files and import them into ZBrush. You can either import each one manually or use the Multi Append feature within the Subtool Master plugin provided by Pixologic. The general rule I follow is that if the model is mirror, I export it together. So, rather than having a left forearm guard and a right one, I simply have one piece. The reason for this is that it means you can just activate symmetry in ZBrush (X) and sculpt both halves at the same time. This can be an issue on older machines, though, as the model itself will become heavier

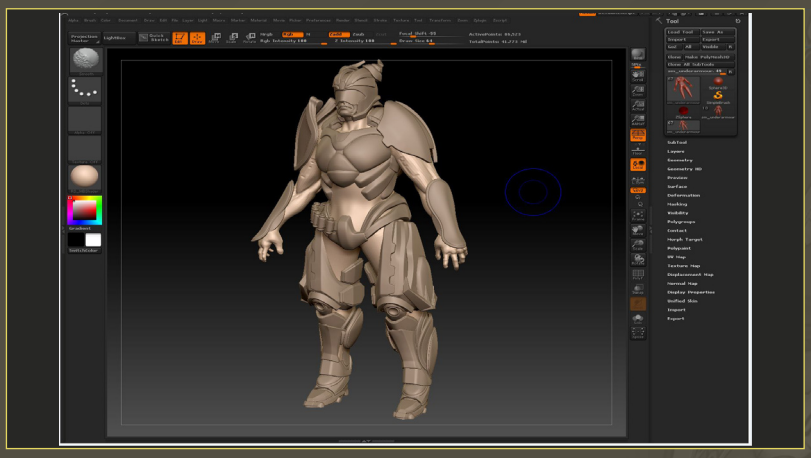


Fig 41

as you subdivide. If that's the case, you can easily export and sculpt one half, then mirror it over for the final presentation.

For each piece, subdivide it multiple times and get to work. Since most of our details are just on the surface, building up detail isn't as important as we've done most of that work already (**Fig.41**).

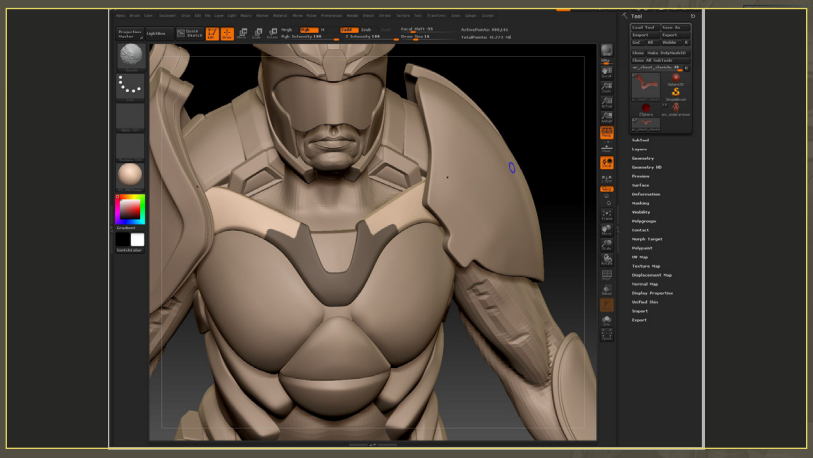


Fig 42

For the majority of the layered plate effect throughout this armor suit, we will be hand painting masks and pushing them out, later refining them with a standard and flatten brush. This is more or less a continuation of the techniques we used previously, but will be focusing more on individual armor pieces (**Fig.42**).

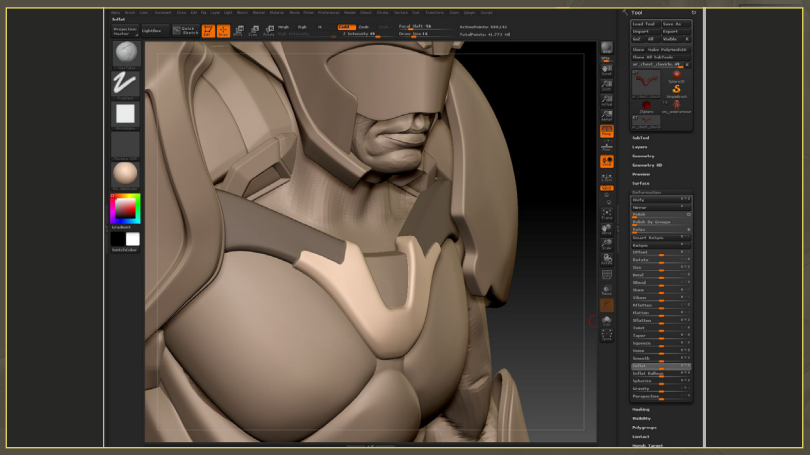


Fig 43

Once the sternum center plate's mask has been painted, click off of the model while holding down Ctrl to invert the selection. This makes the unmasked part deformable. Next, used the Inflat deformation modifier in the right hand panel. You can either manually enter a number after clicking on Inflat or use the slider to enter the value you'd like. I always use this value in XYZ, though you can isolate an axis by simply clicking on its icon (**Fig.43**).

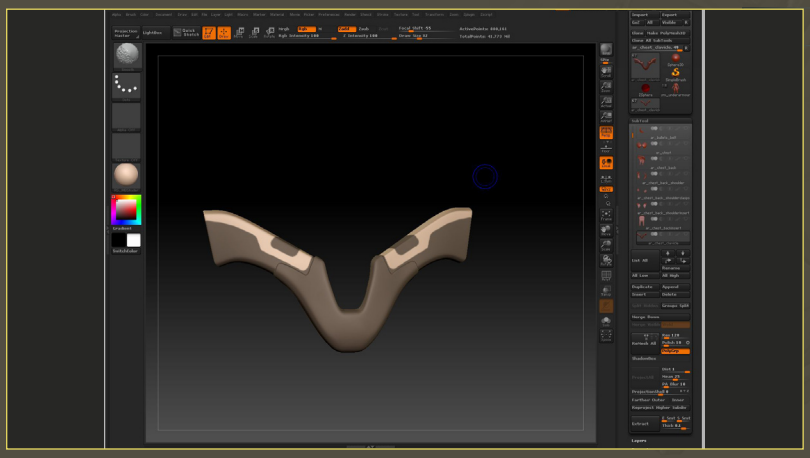


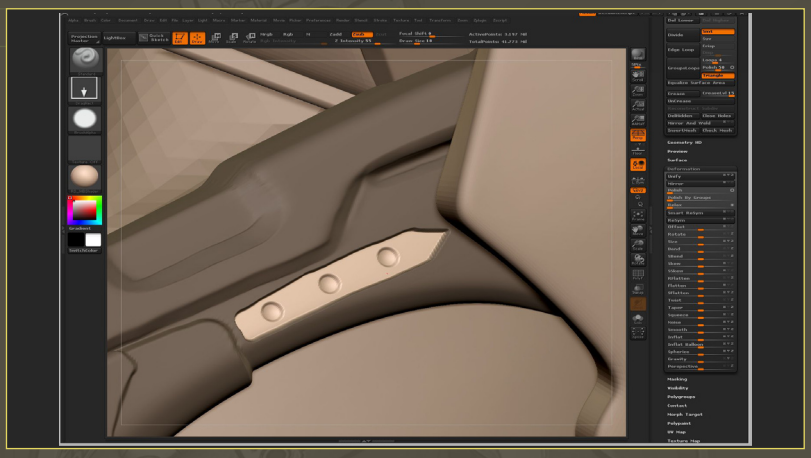
Fig 44

Next, mask out the clavicle ridge and repeat the process of inflating it outwards. After it has been inflated, run a square flatten brush along the inner edge to give it a more organic feel (**Fig.44**).

After this, mask out an insert section under the clavicle area and Inflat it to a negative value, which will, of course, push the model in rather than out. Next, switch to a standard brush and set the mode to DragRect. This will more or less

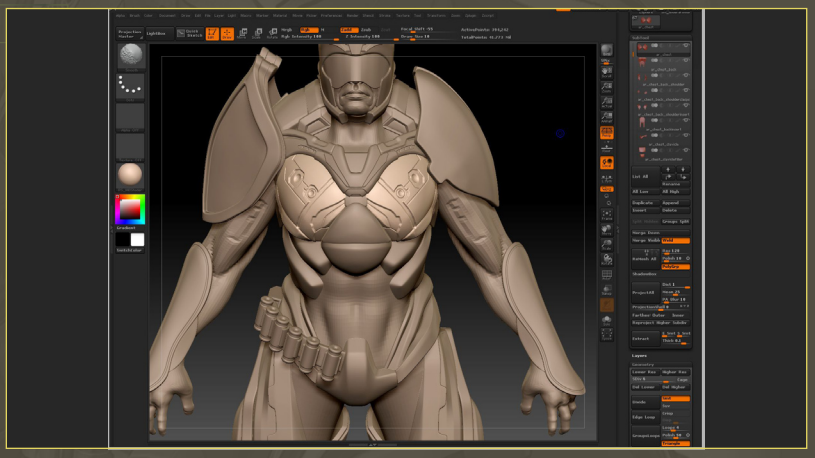
stencil in a detail rather than painting on detail in a stroke. I like to use this for isolated details like bolts and other types of information. With a stock circular alpha, draw out three dots as indicated in the concept art. You'll notice that DragRect requires you to hold each stroke until the final detail is placed, rather than flicking your pen or mouse to draw out detail (**Fig.45**).

Fig 45



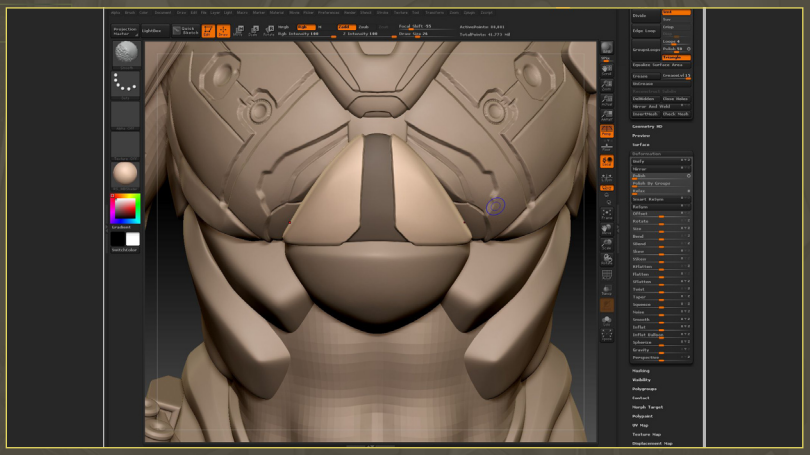
Continue this process for the finer details along the breastplate. Masked everything out and push it inward or outward with the Inflat deformer. For the really fine lines that lead to the deltoid area, use a standard brush with Lazymouse enabled to achieve smoother lines (**Fig.46**).

Fig 46



Next, mask out the panels on the sternum protector. To fully mask around the entire object, you may need to hide the other subtools. This can be done by holding down Shift and clicking over the subtool in the Subtool panel. This will hide all of the subtools that are not currently active. Repeat this process to unhide the subtools (**Fig.47**).

Fig 47



For the detailing, mask out square spaces and inflat them out. After this, create a custom alpha for the circular, port type areas to be used with a standard brush with a DragRect stroke type (**Fig.48**).

Fig 48

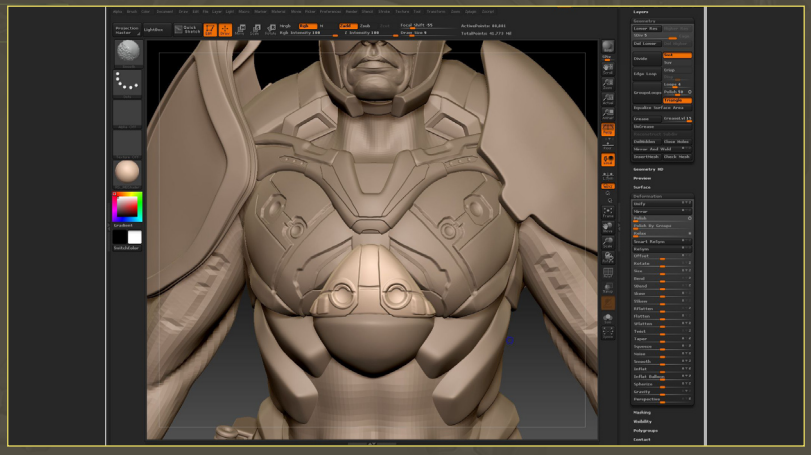




Fig 49

Continuing on with the lower half of the sternum protector, mask out and inflat the paneling detail and create a custom alpha for the triangular type indents near the center of the piece. As you can see, flattening out the edges and popping out grooves with a standard brush really gives the model a stronger look and will eventually bake down better when we create our normal maps (**Fig.49**).

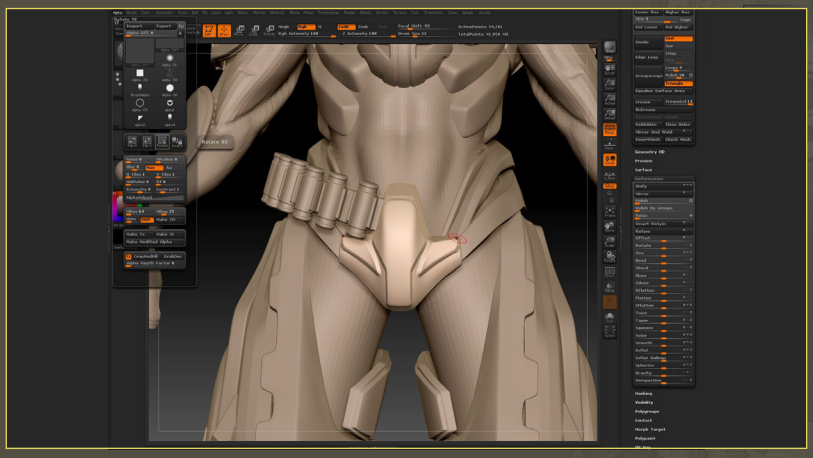


Fig 50

Moving on to the codpiece armor section, you can see a lot of the same theory carried through here. Mask out the main three plate details and inflat them out, rounding out the details with a flatten brush (**Fig.50**).

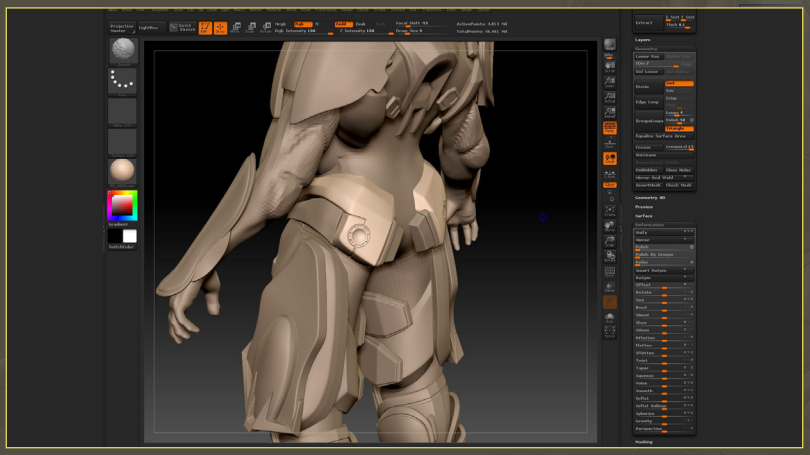


Fig 51

For the most part, the hip armor is mostly finished. In the concept, these sections are fairly simply, as in they mostly consist of a streamlined piece with very little surface detail. This is great as it will allow the eye to rest and avoid the problem of just having a mess of random details that cause the character to be hard to read. There is one key detail, however, and that is the circular indent and the seam connecting the top and lower halves. For the circular detail, simply create a custom alpha and import it into ZBrush. For the seam, this can be painted in with a standard brush using Lazymouse (**Fig.51**).

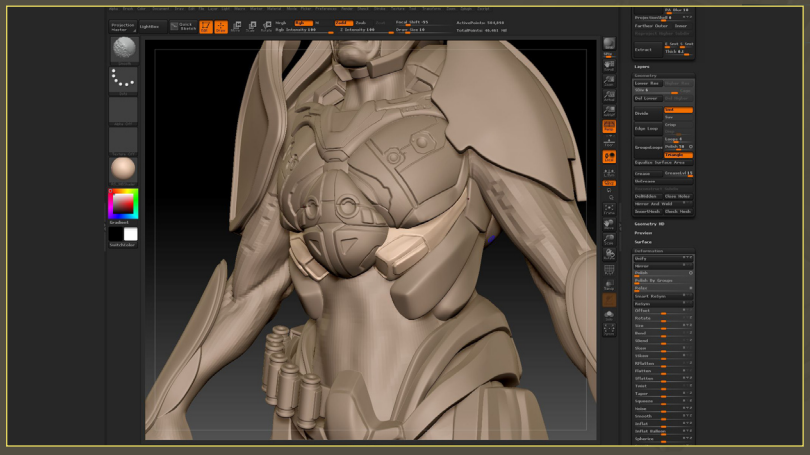
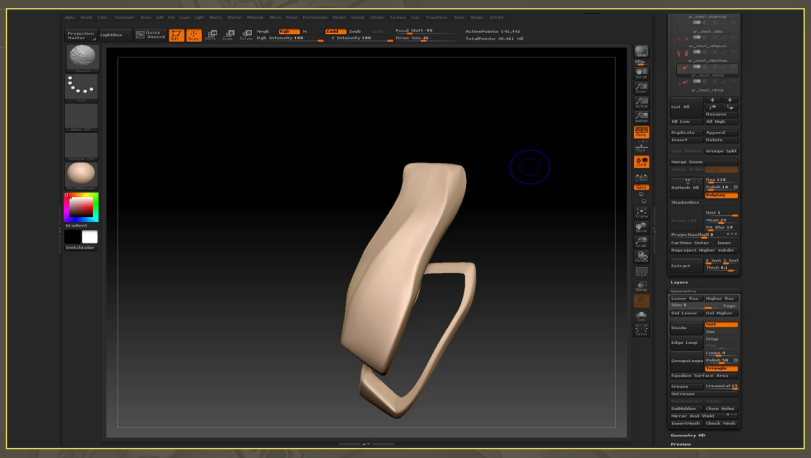


Fig 52

The rib plates, like the hip sections, are fairly basic and are mostly done at this level. Mask in a section for the inside of the ribs, which will act as a home for an LED section to give our character a material change. You can also bring out a nub, which could be interpreted as a connector point as well as the seam which would assist with that detail (**Fig.52**).

For the most part, we can repeat those steps on the next two rib plates, along with flattening out a broad section towards the top of each piece to give each rib plate a more organic feel (**Fig.53**).

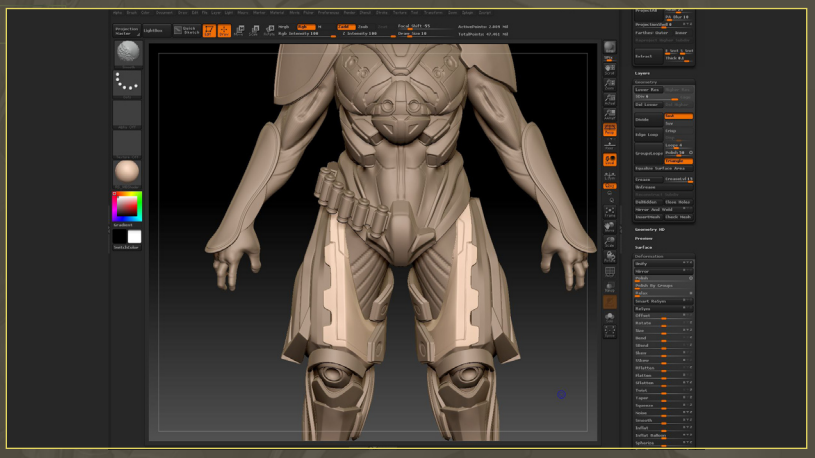
Fig 53



At this stage you can also begin roughing in detail into the under armor. I've basically smoothed down the under armor where it would be clipping through, or near clipping through armor pieces, leaving the fairly exposed sections like the stomach and arms as a base for the final sculpt. Blocking in details, like the ribbing on the legs, will help you to visualize what the final product will be.

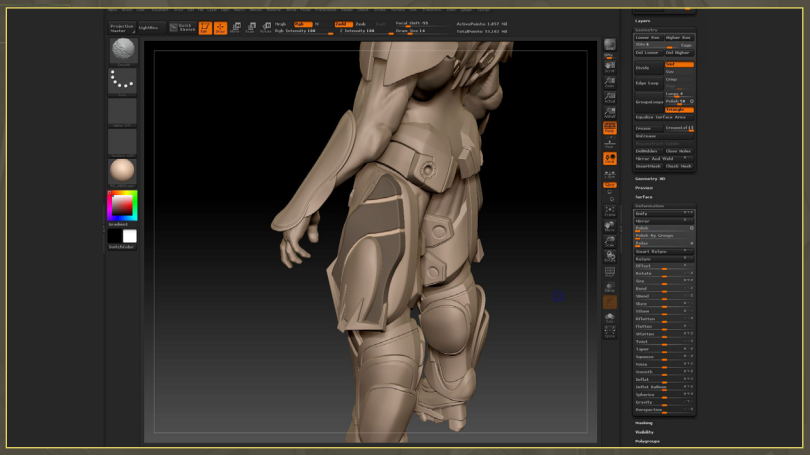
For the inner leg armor plate, mask in an indent towards the crotch just to give some visual interest and add a small seam outlining the tabbed sections (**Fig.54**).

Fig 54



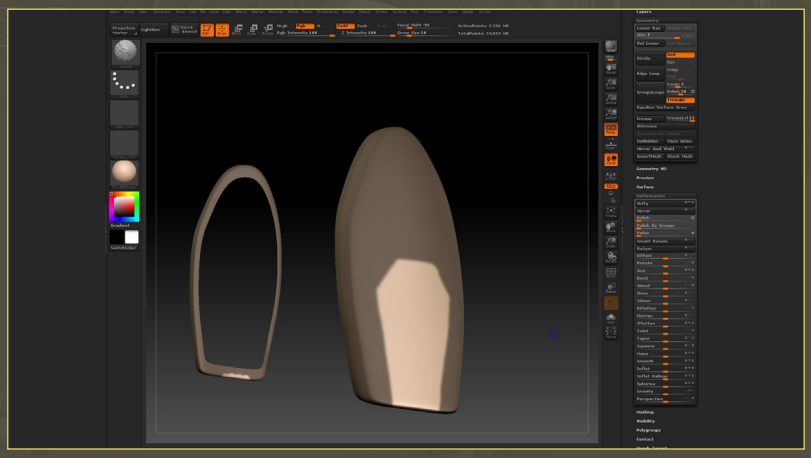
The outer leg armor has deep grooves to give its layered effect. To do this, simply paint where these plates would be and inflat them out. Performing this task the traditional way would take so much longer as you would spend so much time making the model's topology line up just right for a smooth subdivision. This method literally takes a minute (**Fig.55**).

Fig 55



Now, moving onto the dome plate on the side of the leg, mask out the outer insert shape and push it inwards with the Inflat deformer (**Fig.56**).

Fig 56



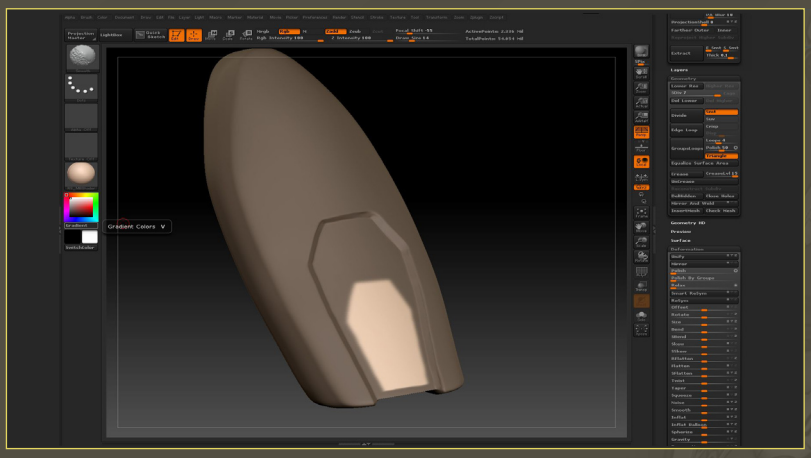


Fig 57

Repeating this process for the inner insert section, paint it out and Inflat it with a negative value. If you find that your lines are not crisp enough when painting masks, you can enable Lazymouse for your masking brush. While holding down Ctrl to access your masking brush, navigate to Stroke > Lazymouse and enable it, adjusting its settings to your liking. Likewise, if you find that your masks are too sharp and are causing artifacts when you inflat the mesh, you can easily blur the mask by holding down Ctrl and clicking on the model (**Fig.57**).

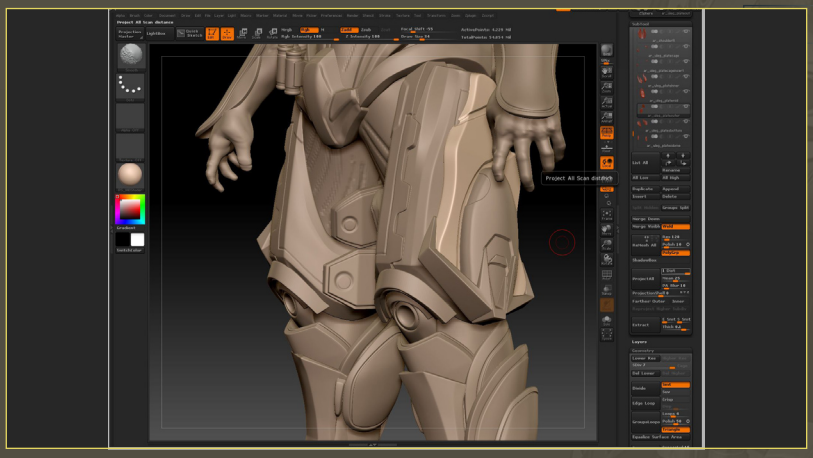


Fig 58

The final composition for the leg armor shows that, really, the detail that we blocked out earlier is really enough information for this section. Adding too much fine detail can really become noisy and hard to read. Simply adding a few interesting surface details here and there can have a bigger impact than adding detail to every pixel (**Fig.58**).

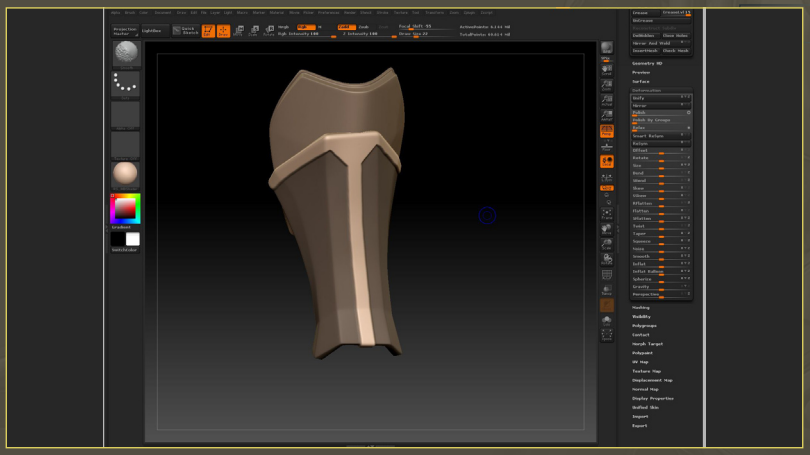


Fig 59

For the shinguard, push out a broad rim that surrounds the top of the plate and runs down the center of the shin itself. After this, add fine seams (which you'll see in the concept if you look closely) with a standard brush using Lazymouse (**Fig.59**).

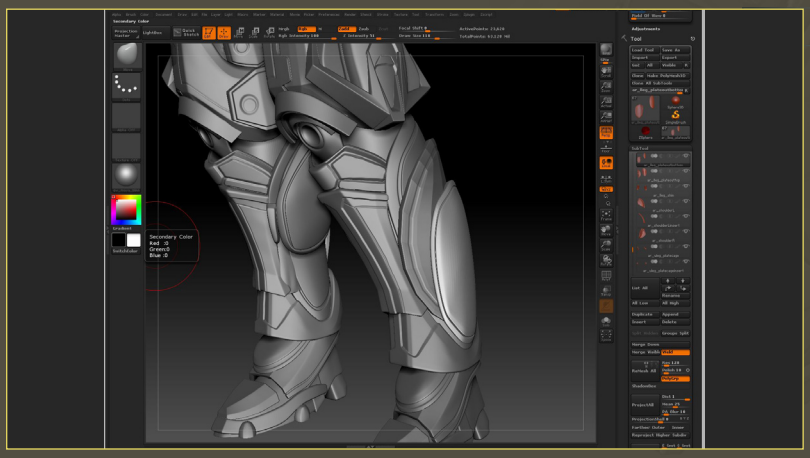
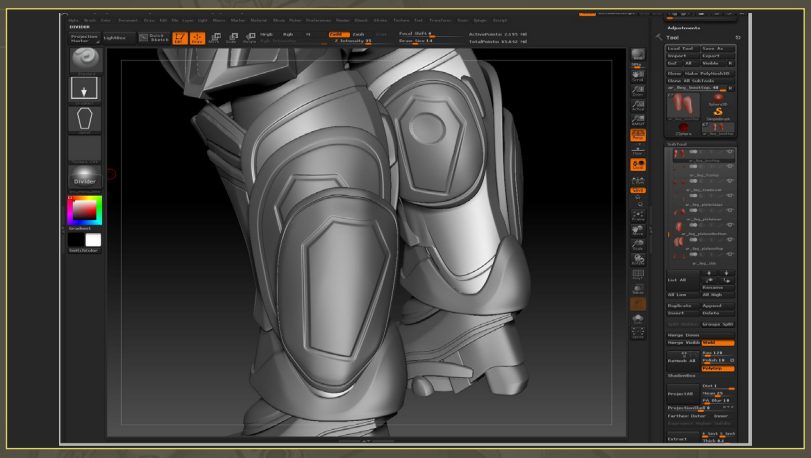


Fig 60

For the calf plates, push them in to close gaps using the Move brush. The reason for this, thinking ahead, is that it will be much cheaper to just model a low poly boot that surrounds this entire armored area rather than modeling the shelves that would have been created with these gaps. This also barely changes the final silhouette (**Fig.60**).

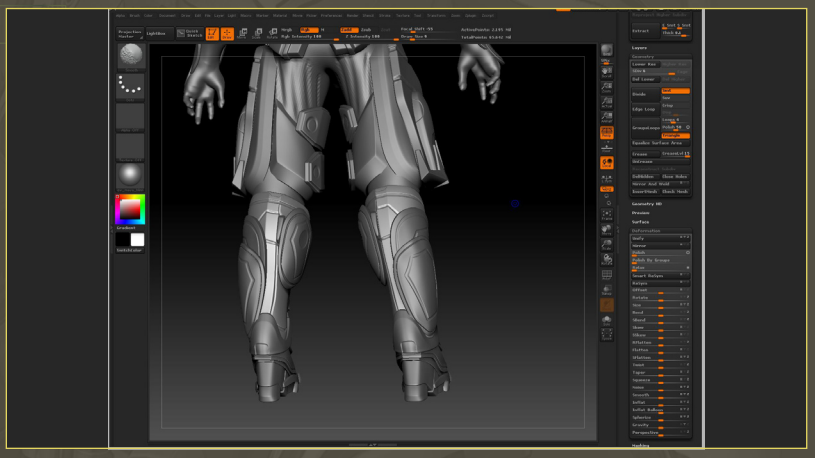
Most of the major seams have been modeled into the base mesh for the calf plates. To add a few interesting details, create a custom alpha (a coffin-type shape that is indicated in the concept art) and drop it onto each plate using DragRect. This creates a nice, subtle layered effect (**Fig.61**).

Fig 61



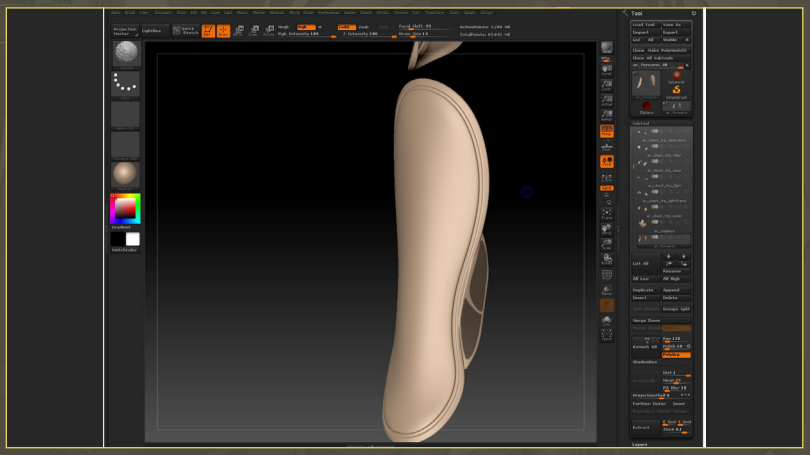
The boots can be mostly left untouched as most of the detail has been covered in the base mesh. Also, it is generally an area that doesn't have a lot of resources devoted to it as the feet are usually an area that most viewers don't pay attention to when playing a video game. That being said, you can go ahead and add a few seams at the back of the leg and the top of the boot. And I've also decided we should take out the detail connecting the boot and the shin armor that was indicated in the concept art as this will certainly prevent the foot from moving realistically in animations (**Fig.62**).

Fig 62



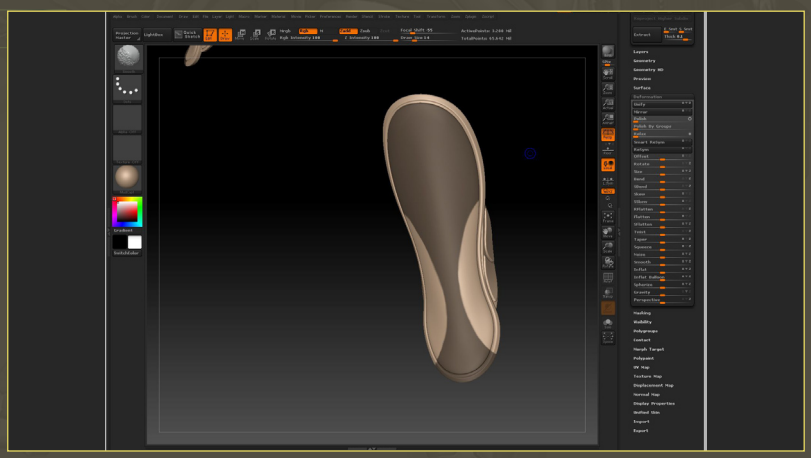
By comparison to other sections of the armor, the forearm plates are fairly basic and straightforward to detail up. Starting with the panels that come off to the side, mask out two chunks and inflat them outwards (**Fig.63**).

Fig 63



Next, mask out the inner shape, cutting it off at the outer trim seam that we created in our base mesh (**Fig.64**).

Fig 64



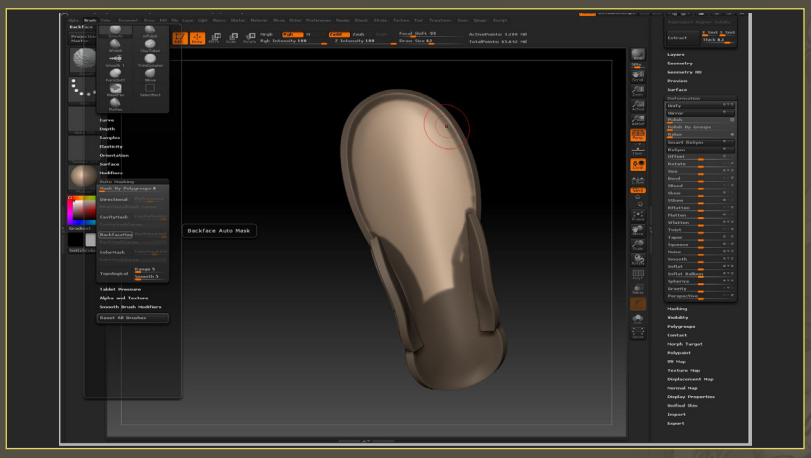


Fig 65

This is a great opportunity to bring up a problem about thin, double sided objects. In ZBrush, if an object has a front and a back side and those two sides are close together and you sculpt on one side, the opposite side will be affected. That is to say, ZBrush doesn't cull out faces by default. However, if you go to the Brush panel and navigate to Auto Masking, you will be able to enable Backface Auto Mask which will remedy this problem. You may run into this problem with the forearm guard as you can't have the back masked out, but have the peanut shape in the front unmasked too (**Fig.65**).

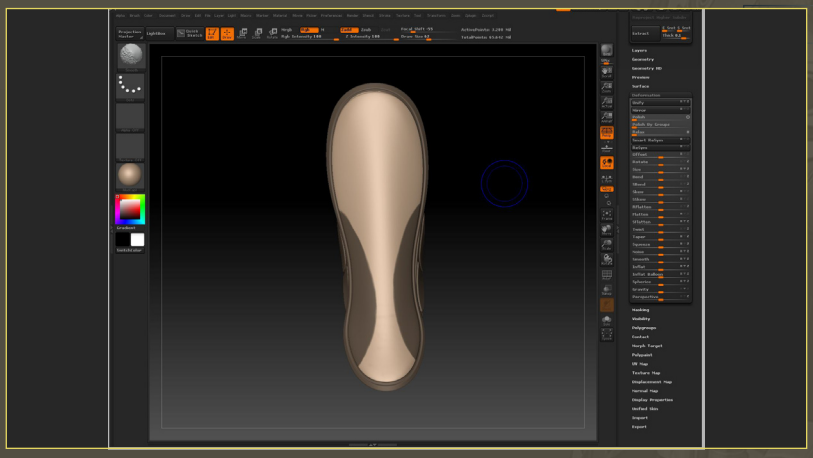


Fig 66

With the final shape masked in, inflat the detail out and refine its shape with standard and flatten brushes (**Fig.66**).



Fig 67

It's always a good idea to take a step back from your sculpt and see how everything looks together, especially with a complex character such as this where there are multiple layers of detail (**Fig.67**).

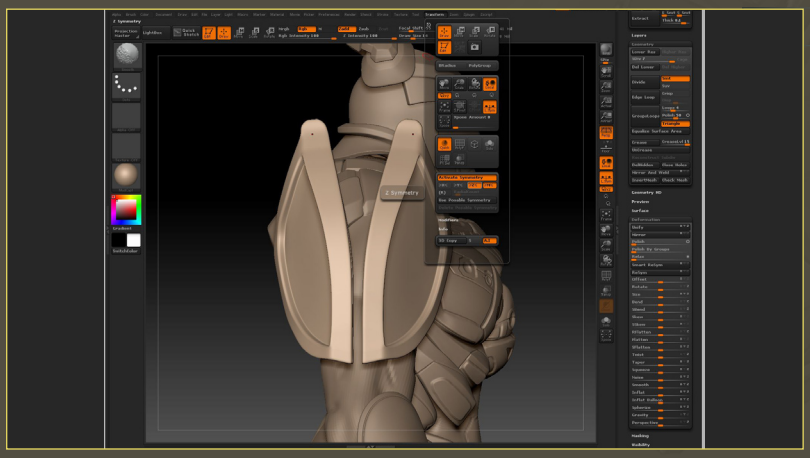
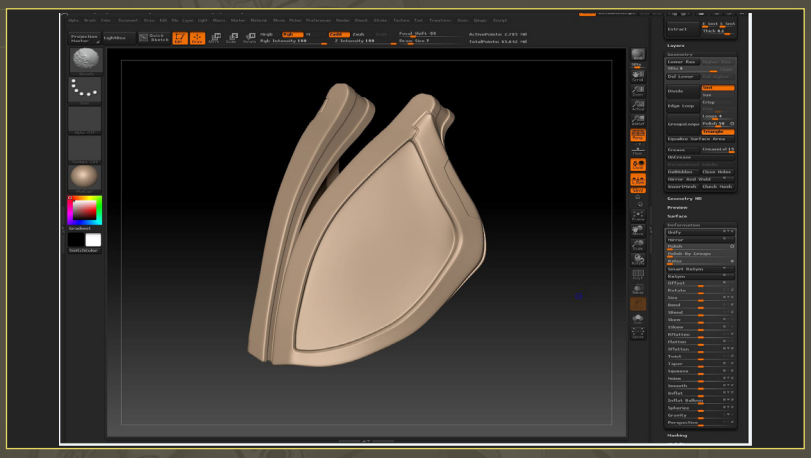


Fig 68

For the right shoulder pad, you'll notice that the symmetry axis for this model is a bit different. Not only is it on the Z axis, it is also off center. In order to make this work, we will need to activate symmetry in only the Z axis and enable Local Symmetry by clicking the Local Symm icon towards the right of the screen. This will use the object's center point rather than the world's center point (**Fig.68**).

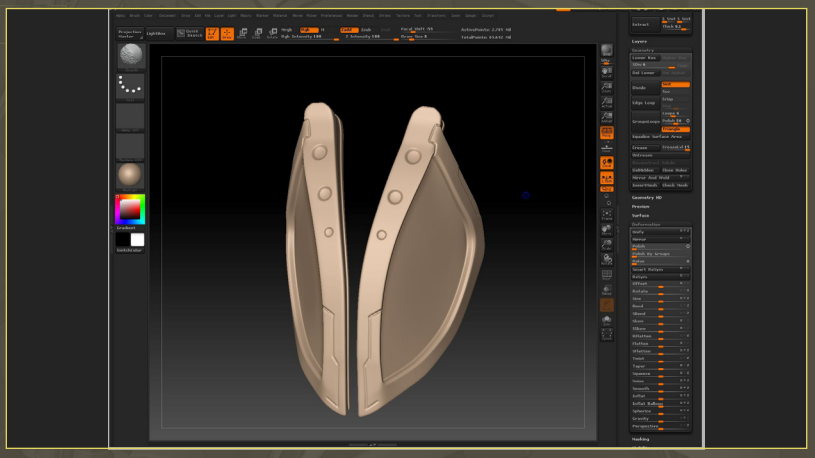
Begin by painting fine seams and masking out indentations on the rim of the shoulder pad (**Fig.69**).

Fig 69



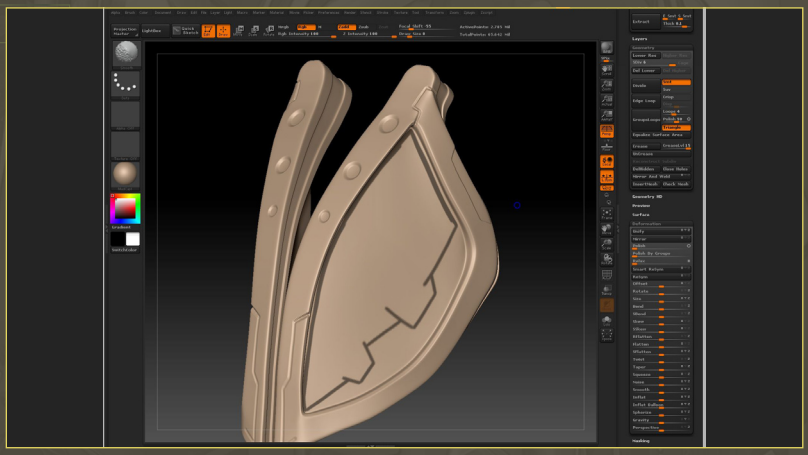
There are some details hinted at on the mood concept image that I really like, such as the holes on the inner edge and the seam work on the frame in general. To translate that into 3D, we can simply use a standard brush for the seams, as usual, and a circular blended alpha set to DragRect for the holes, tapering them in size towards the middle of the shoulder pad (**Fig.70**).

Fig 70



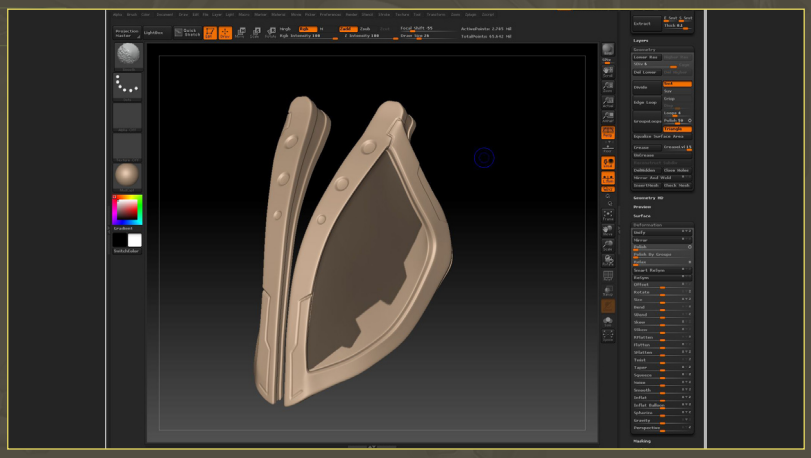
For the inner plates of the shoulder pad, I think it's best to mask out the major shape or the combined shape of all the plates and work in from there. So, to begin, mask it all out using Lazymouse (**Fig.71**).

Fig 71



Sadly, there's no quick and easy way to fill in a shell with the Mask tool. Though, I find it much easier to draw the outline first and fill it in with a bigger brush for the mask. Basically, like a coloring book, it allows you to keep the sharper edges caused by painting with Lazymouse and a fairly quick way of covering big shapes (**Fig.72**).

Fig 72



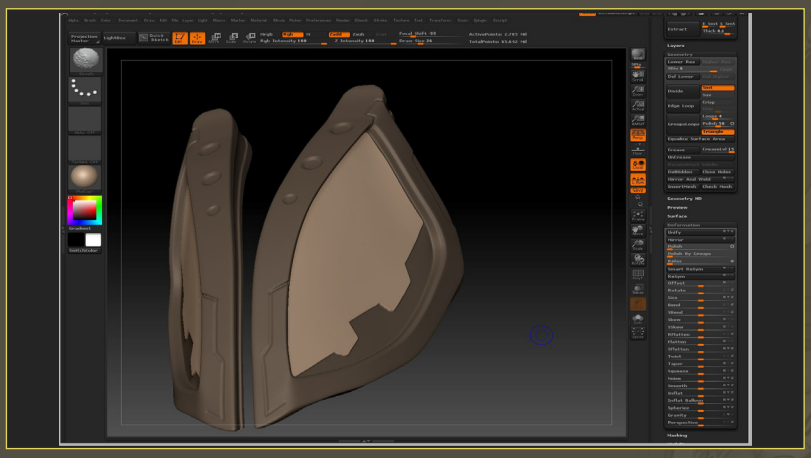


Fig 73

As mentioned earlier, we want to invert the mask and inflat the entire inner plate outwards. This really makes the shoulder pad take shape and you can quickly see how the final product will look (**Fig.73**).

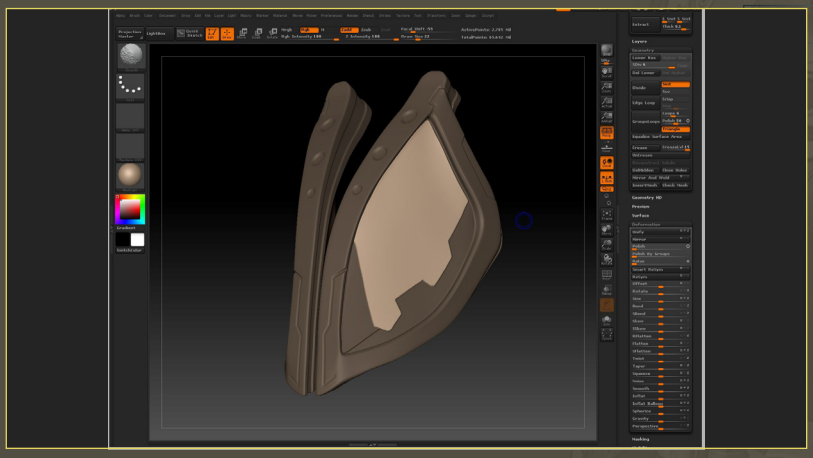


Fig 74

Next, reduce the entire area to include the last two plates and repeat the inflation process. Once that is done, reduce the masking to include only one of the plates and inflat it once again. The final result is a staircase sort of look that will give the illusion of layered metal plates (**Fig.74**).

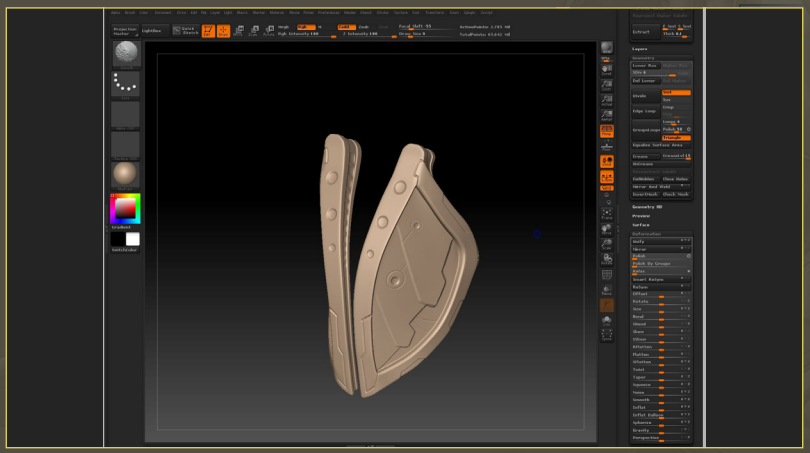


Fig 75

Once all of the plates are pushed out, run a flatten brush over the edge to mimic a beveled edge. After that, drop in a few details like holes, outer rings and thin seams with stock alphas and the standard brush. For the inside of the shoulder pads, drop multiple square alphas using a Standard DragRect brush, being sure to taper them along the way to fit in between the ridges (**Fig.75**).

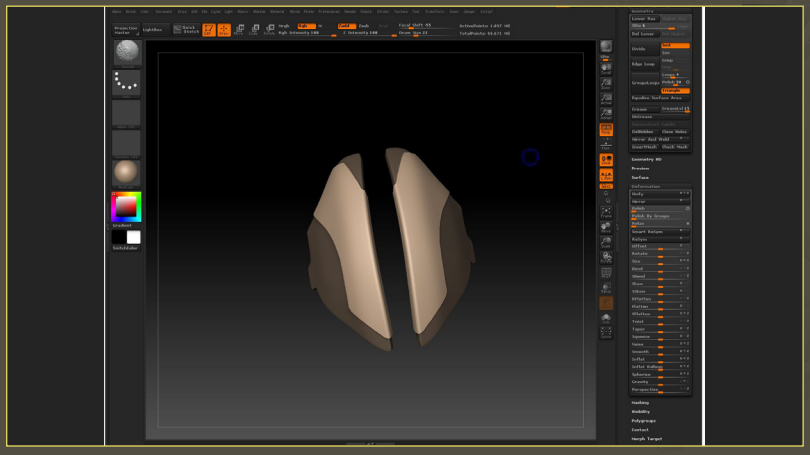
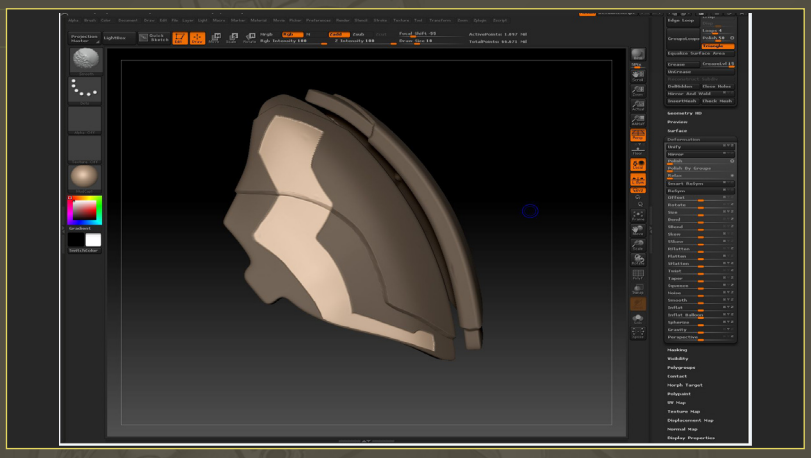


Fig 76

The left shoulder pad has an interesting overlap for its armor panels. First, we're going to tackle the bigger section: the curves from the top corner down to the inner corner. Mask out this section, wrap around the inside of the shoulder pad itself and push out the sections themselves with Inflat (**Fig.76**).

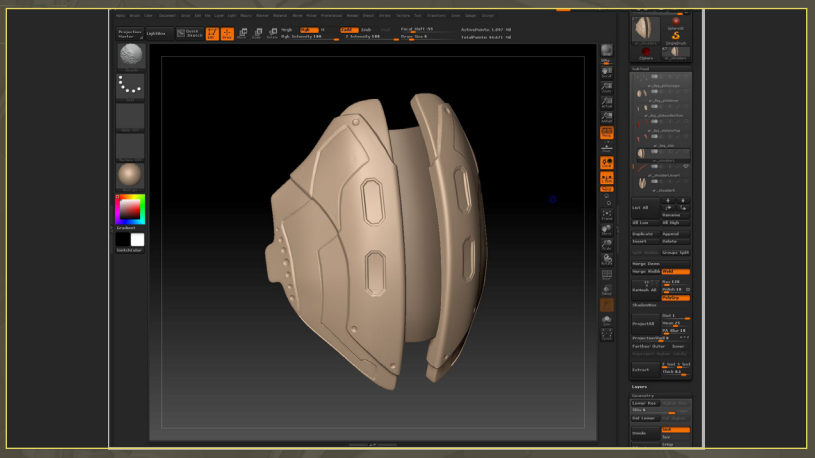
Next, we want to paint the metal section that will be inserted into the shoulder pad by creating the mask and inflating the geometry inwards. This gives a nice organic result as the insert will conform with the previous plates (**Fig.77**).

Fig 77



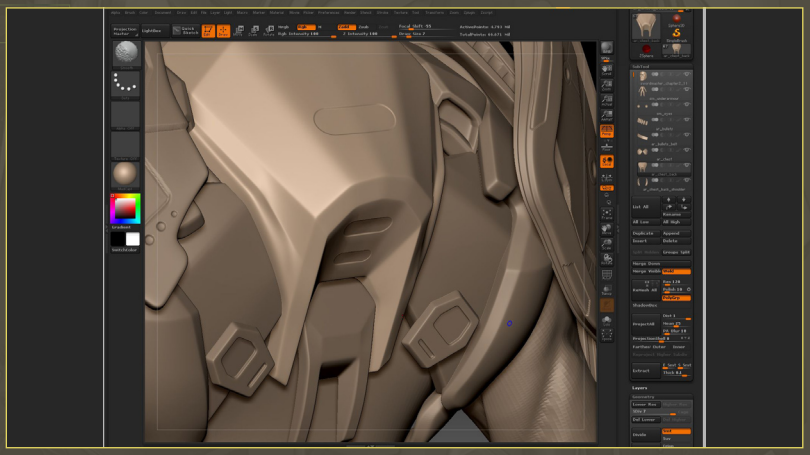
Finally, add a few small details like screw holes and tapered holes towards the connector tab that is hinted at in the concept art. I also created a unique alpha that I import in which is a stretched octagon which becomes our vents (**Fig.78**).

Fig 78



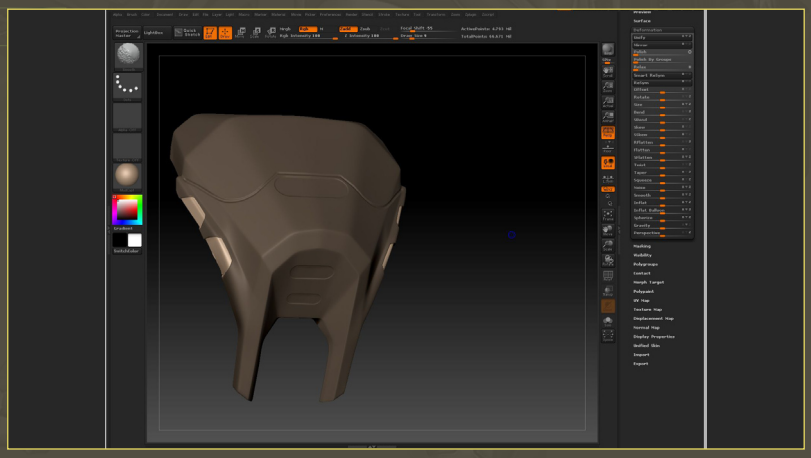
Next, drop a few alphas down to create vents for the main backpack piece. These are custom alphas as well, made by elongating circles and importing them into ZBrush as a 2D, grayscale image (**Fig.79**).

Fig 79



Create the seam up top, which hints towards the idea that this compartment can either be opened or overlaps here onto the lower piece, by freehand drawing with the standard brush. For the inserts on the side of the pack itself, mask the objects out and inflat them inwards (**Fig.80**).

Fig 80



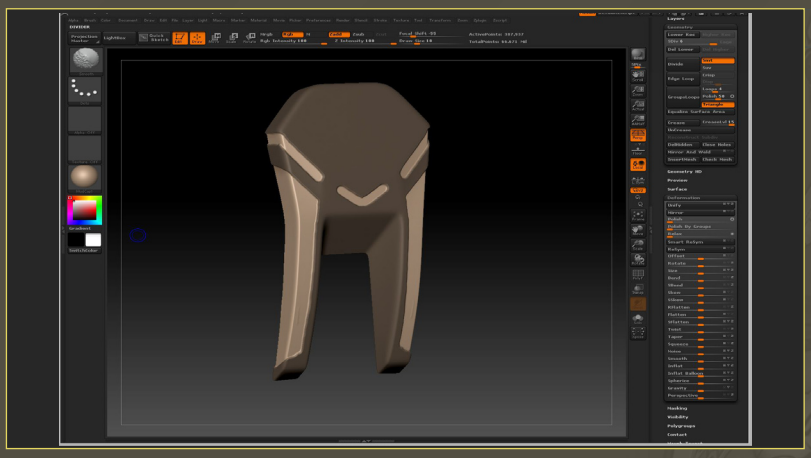


Fig 81

For the backpack insert, simply hand-paint the masks, which is made easier due to symmetry being activated, and push those sections in (**Fig.81**).

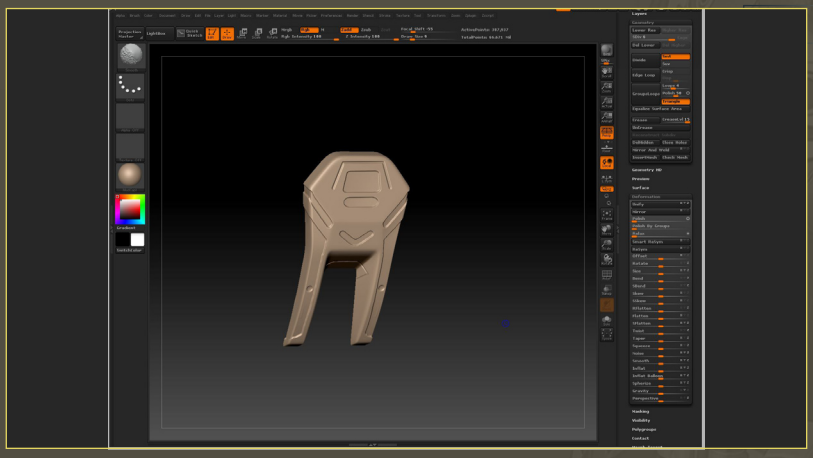


Fig 82

Using a custom alpha for the center details and the stock circular alpha, use the standard brush to finish off the surface details (**Fig.82**).



Fig 83

Skipping over to the neck, on the underarmor subtool that we created earlier, smooth out the area and flatten out the sternomastoid muscles by using a flatten brush with a hard square brush. This allows us to have a natural look to the neck area, as if it can still move slightly, but still hint to the fact that it is armored by adding these somewhat hard edges (**Fig.83**).

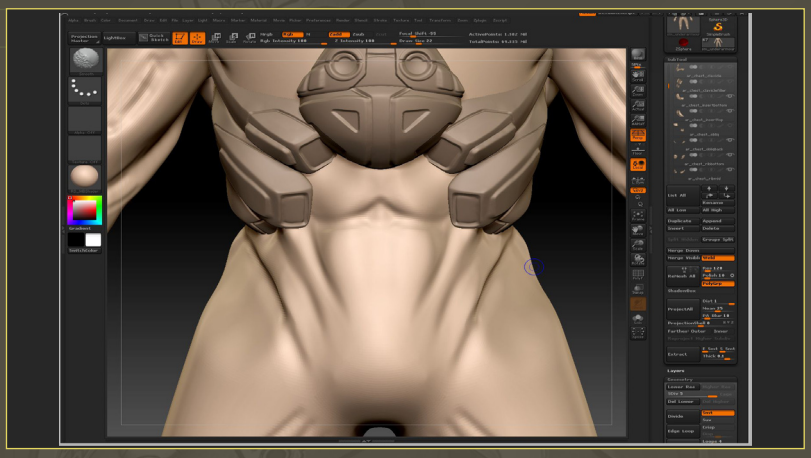


Fig 84

Next, using a standard brush, draw in the ribbing that will allow this section to bend in on itself. Try to get each line as even as possible as, for the most part, it's all eyeballed. Don't be afraid to hide other, inactive subtools to overpaint detail here to hint that the ribbed detail would continue under the armor plates (**Fig.84**).

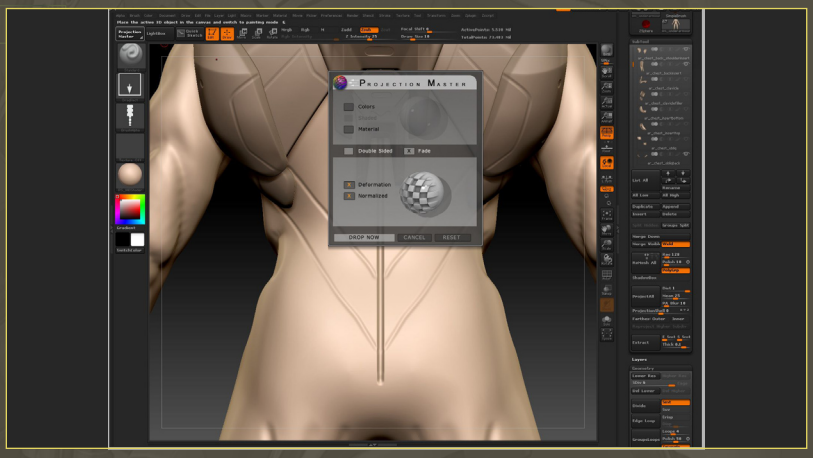
Moving down to the abdominal section, loosely sculpt in the muscle detail here, being sure to not go overboard as much of the material over the top of the flesh would hide these cuts. Once the muscles are blocked in, run over the surface with a higher intensity brush to create seam work that would allow the material to deform and also adds a nice point of interest (**Fig.85**).

Fig 85



Moving around to the back, add some seams that roughly follow the flow of the back muscles on a human. You'll notice that there is a nice detail insert that will act as a spine protector in the concept. To tackle this, rather than using the DragRect Standard brush, let's use Projection Master.

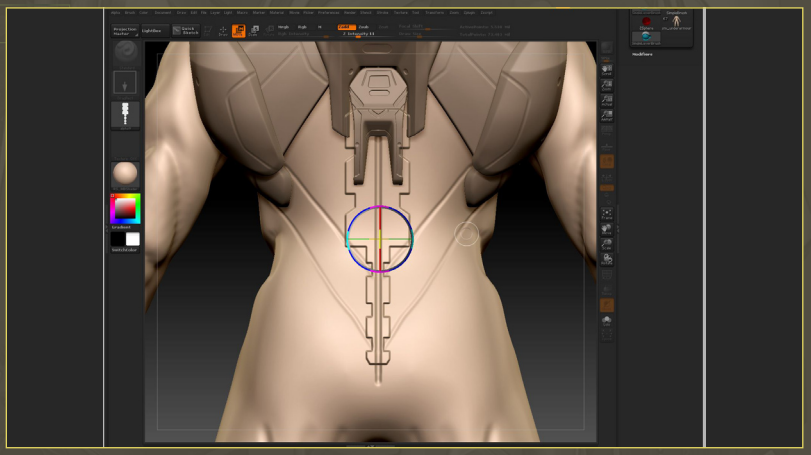
Fig 86



Projection Master essentially locks your model temporarily on a 2D plane. From here, you can drop detail onto the canvas which you can then move and scale, and also change the intensity and directionality of. To enter Projection Master, simply click on Projection Master in the top left corner with your subtool active, enable Deformation and Normalized (just for this example – you certainly can use the other features in different scenarios) and click Crop Now (**Fig.86**).

Next, import the alpha that you've created, which consists of tapering hard edges that mimic the human spine, and draw it onto the canvas. This should seem familiar as it is practically the same as the DragRect Standard brush function, just much easier to control in this situation and with the ability to alter the information after it has been drawn onto the canvas (**Fig.87**).

Fig 87



Once that detail is in place, click on Projection Master again and select the Pick Up option. This will convert the details on the 2D canvas onto your 3D model. Once this is done, mask out the panels that run from the spine to the delts and inflat them outwards (**Fig.88**).

Fig 88



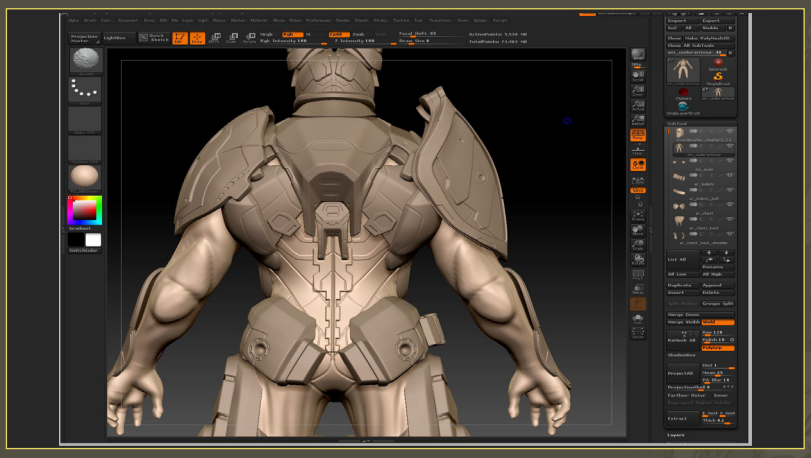


Fig 89

To finish off the back, draw in a few seams with a standard brush that just help break up the area (**Fig.89**).

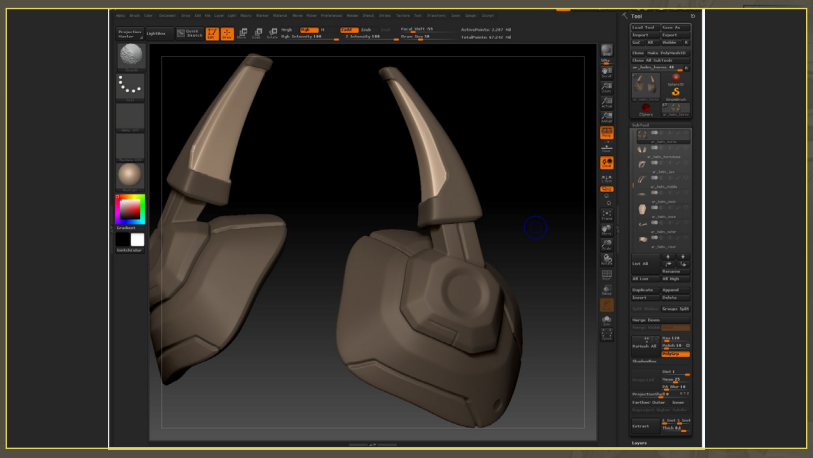


Fig 90

Moving on to the helmet, we're going to start with the antennas. Freehand in the seams to give the impression that this piece could come apart and is even daintier than the other armor pieces. Also mask out the inner section, which will be pushed inwards and detailed up (**Fig.90**).

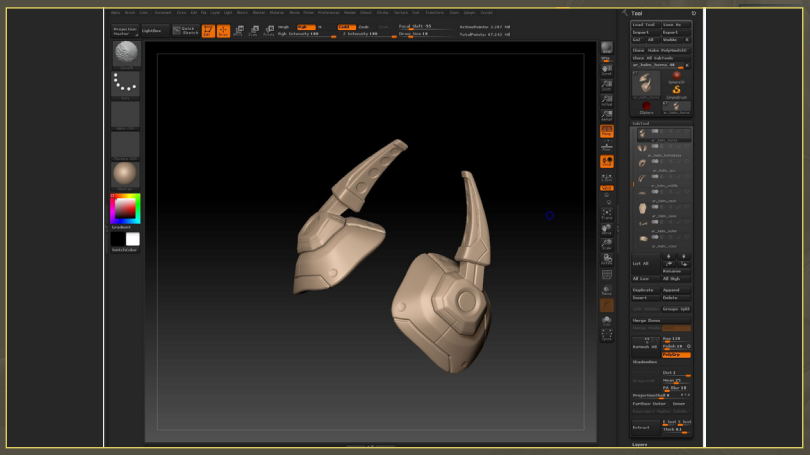


Fig 91

To finish of this section, drag in circular details for bolts and pieces that hint towards receptors or some type of communicator. Punch up the details by running a standard brush over them, for the most part sharpening grooves (**Fig.91**).

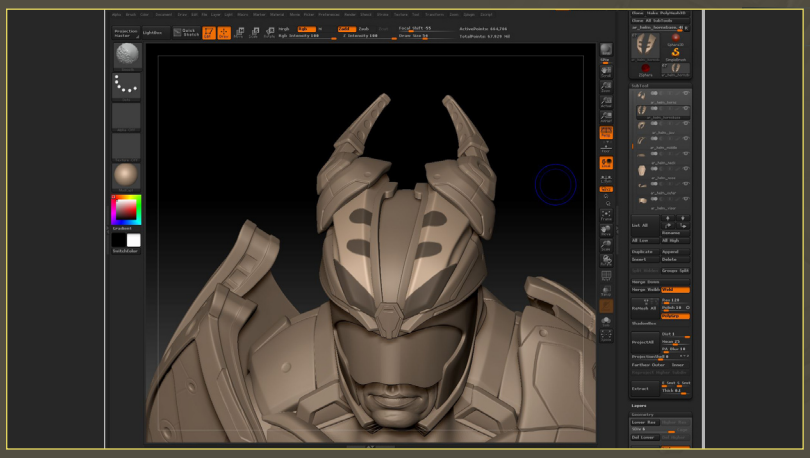
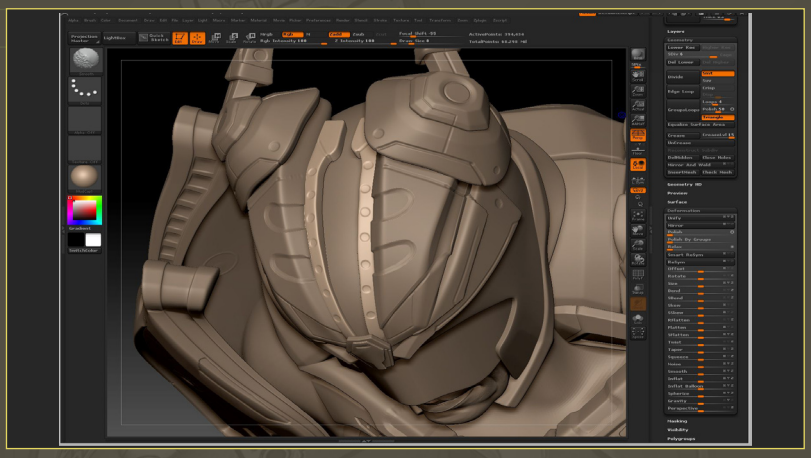


Fig 92

Moving on, the nose bridge armor has a fairly interesting pattern in the concept created by bulking up the metal plate with different layers. The armor band running along the top of the head is also an interesting piece in that it has a nice organic curve that, I think, helps pop it out from the otherwise sharp looking helmet. Once you've painted the curve, mask in the inserts and push them inwards, polishing them off with a flatten brush (**Fig.92**).

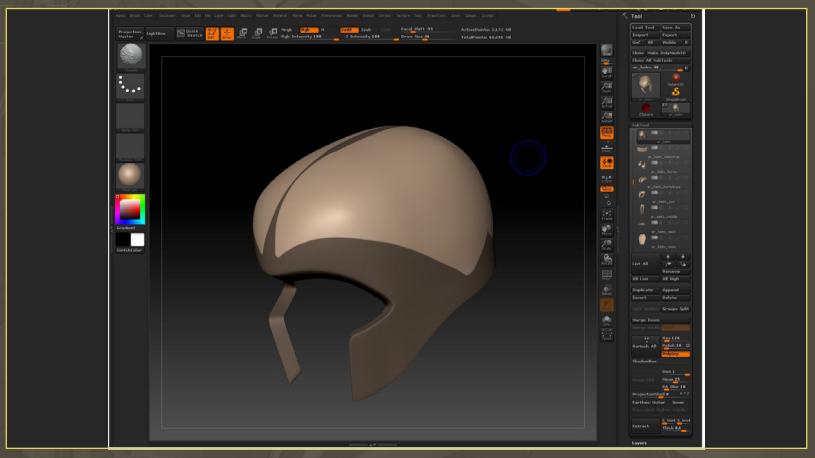
For the remaining armor plates that we have created base models for, sculpt in a few seams with a freehand standard brush. For the center plate on the top of the head, use the Stitch brush with a circular alpha. The Stitch brush acts much like a standard brush with Lazymouse enabled; just that rather than painting a solid stroke, it will space out the alpha equally making it ideal for repeating patterns like stitches and bolts (**Fig.93**).

Fig 93



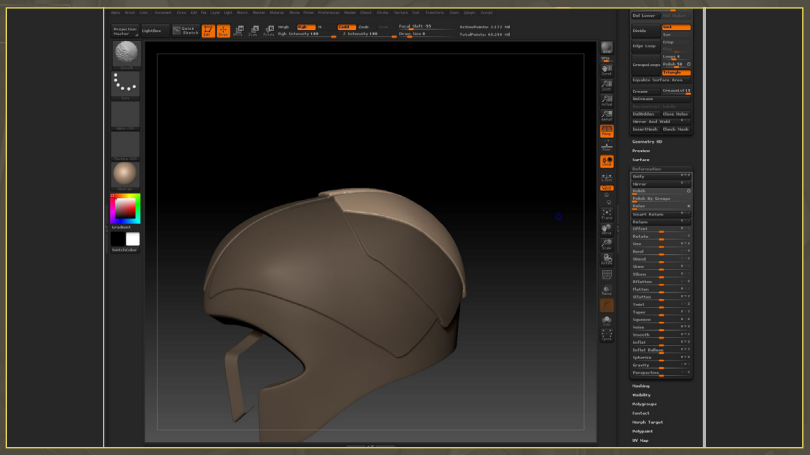
Moving on to the base of the helmet, the process for creating the plated materials that are close to the head resembles the same procedure done on the right shoulder pad. First, paint out the bulk shape of the plates and inflat them outwards (**Fig.94**).

Fig 94



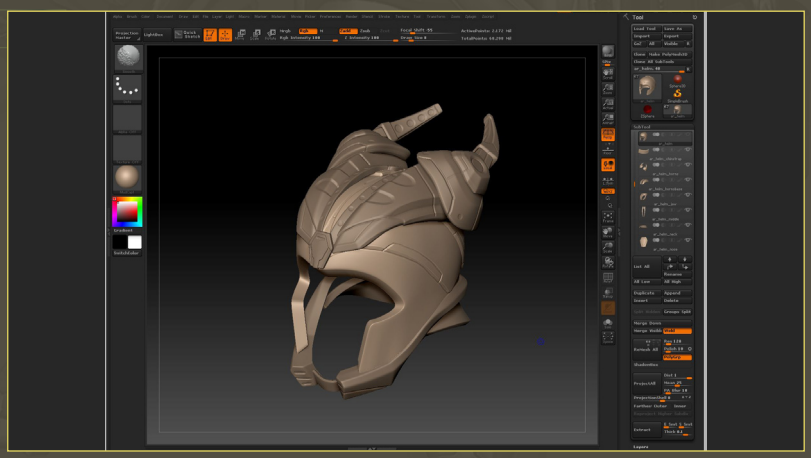
Once this is done, reduce the selection by masking out the lowest level plate and push the new section outwards, repeating the process for the last plate (**Fig.95**).

Fig 95



Taking a step back, we can really see the helmet coming together and how all of the details are working once all of the pieces are visible (**Fig.96**).

Fig 96



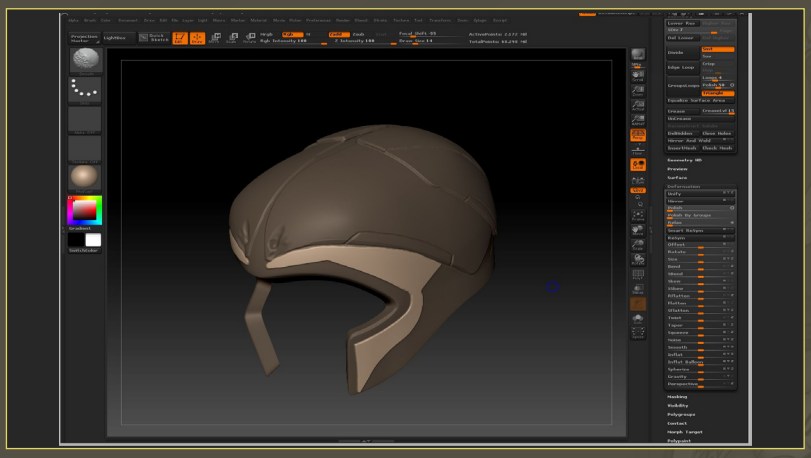


Fig 97

Next, mask out the armor piece that wraps around the brow line and down towards the jaw (**Fig.97**).

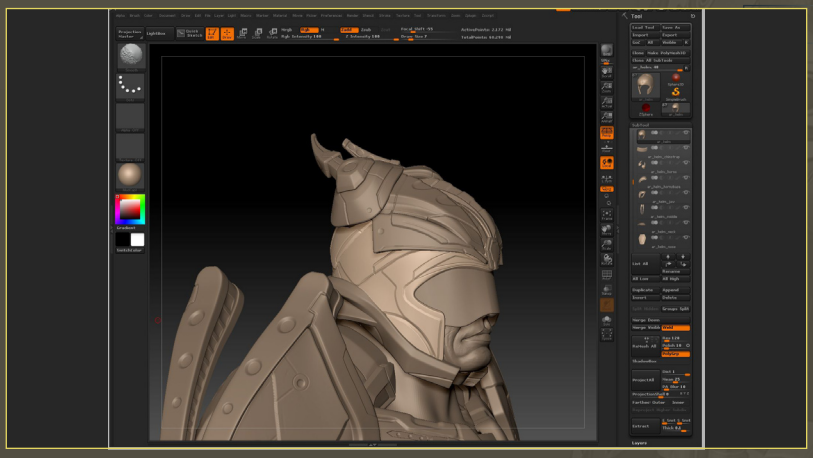


Fig 98

Once all of the panels are sculpted out, give the entire helmet a polish pass by beveling the edges with a flatten brush and strengthening the grooves with a standard brush. At this point you can also add in finer details like seams and bolts, as well as the seam work that spans from the bridge of the nose and goes over the brow (**Fig.98**).

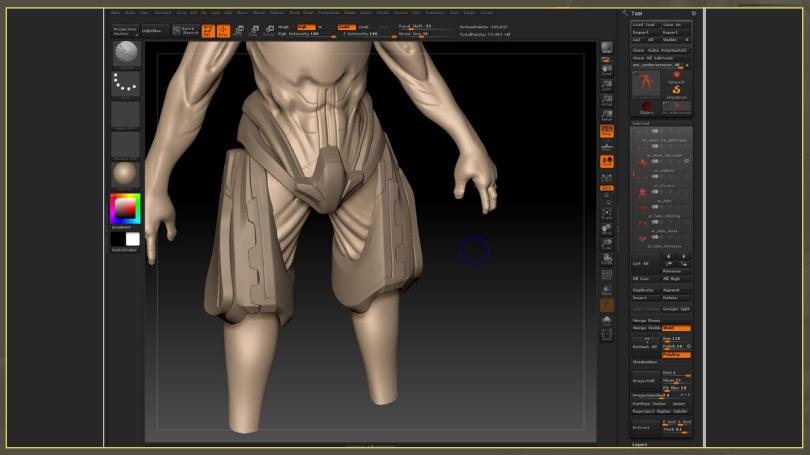


Fig 99

Moving back to the thighs of this character, block out the ribbing hinted in the concept art by running a standard brush, with Lazymouse activated, from the crotch down towards the knee. Use a fairly low intensity here so as to not push the detail out too far (**Fig.99**).

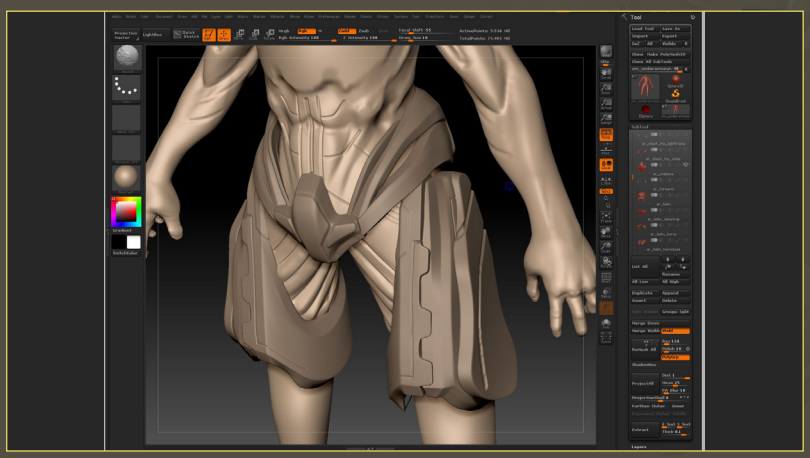
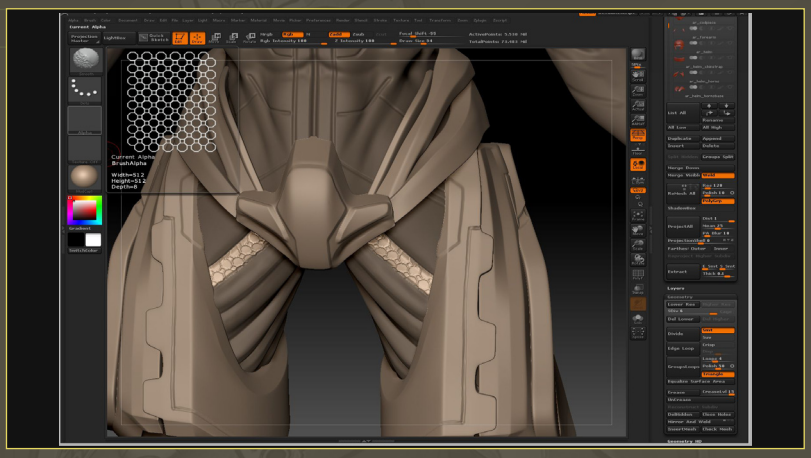


Fig 100

Next, move up in subdivision levels and deepen the creases between these ribs with a higher intensity brush. Also run a flatten brush over the panel closest to the pelvis as this will be a different material (**Fig.100**).

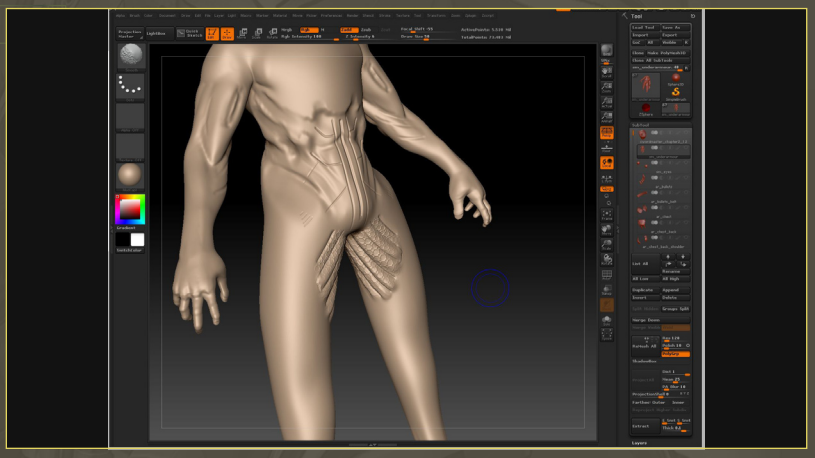
Mask out each rib individually and bring in a custom alpha that consists of connected octagons. Using a DragRect stroke type, drag this detail at a low intensity over the exposed area (**Fig.101**).

Fig 101



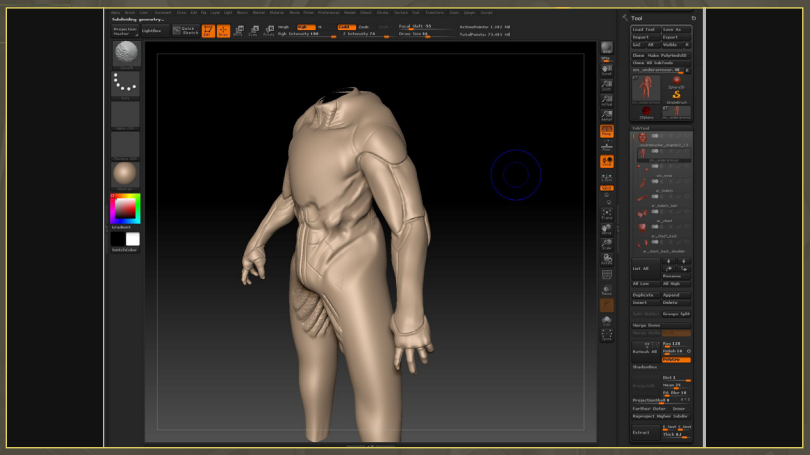
Repeat this process for each ribbed section, smoothing out the area using a low intensity brush after the fact to remove any obvious artifacts. The idea here is to just introduce a new material that will stand out from the metal plates, but not be overly distracting. The webbing also hints to the fact that this area is probably less armored as it needs to be able to move freely (**Fig.102**).

Fig 102



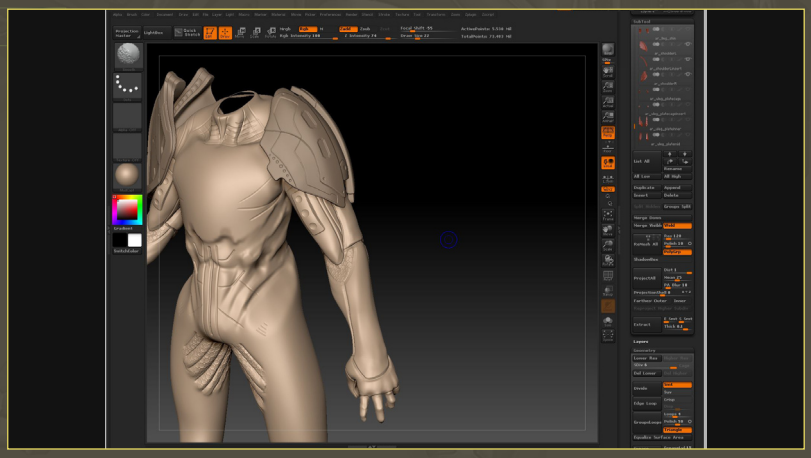
Continuing on with the organic material body armor, most of the muscle detail has been blocked out in our sketch sculpt. Refine these areas by smoothing them out where needed and finally draw in the different sections, which hint towards padding in the suit and construction that allows the human underneath to move around, with a standard brush (**Fig.103**).

Fig 103



Bevel these areas with a flatten brush and refine the seams with a standard brush. After this, incorporate a panel on the bicep (which is indicated in the concept) by masking out a rounded rectangle shape and dropping in port holes with a DragRect brush and circular alphas. Also mash the inner elbow and drag in the webbing pattern we used on the thighs. Reusing this material helps show that it is reserved for deformable areas (**Fig.104**).

Fig 104



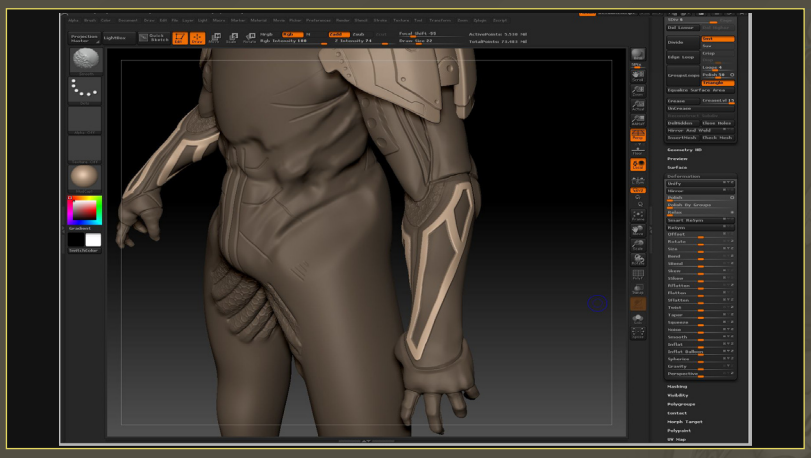


Fig 105

Next, mask out the edging detail on the forearms and inflat them out. For the most part, these details will be hidden by the forearm plate itself, so be sure to double check that the information you're creating will be seen (**Fig.105**).

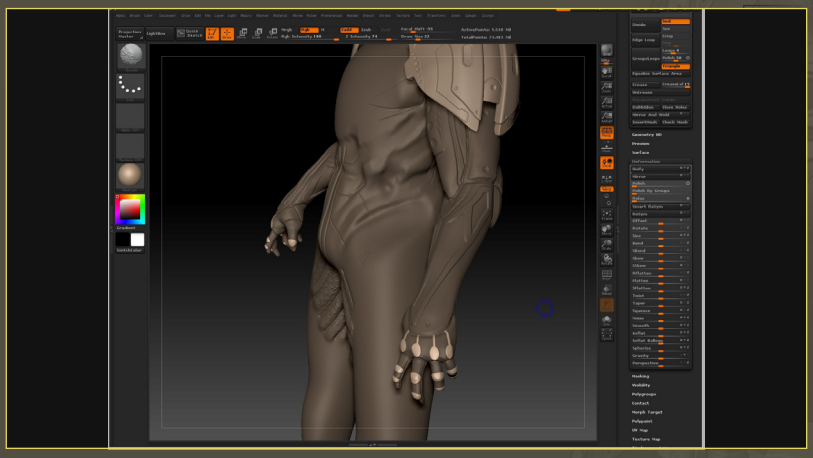


Fig 106

Next, mask out the knuckles and inflat them. This creates the idea that these joints are at least slightly more armored than the basic pieces (**Fig.106**).

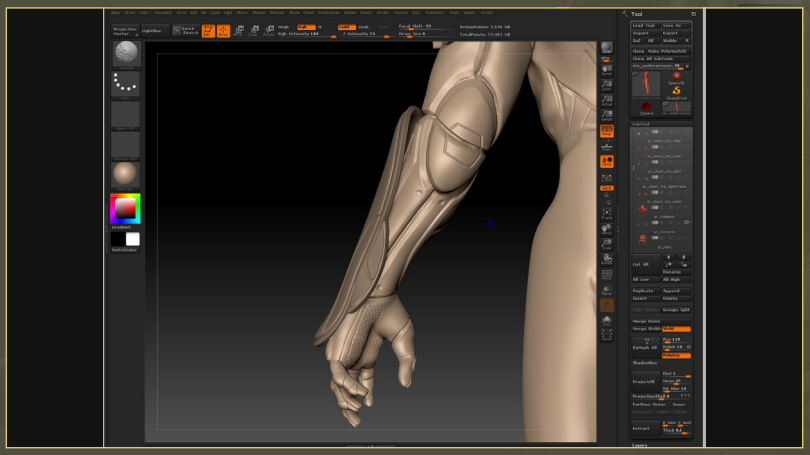


Fig 107

Finally, to finish off the model, mask out the palm and add the webbing patter to this area as this is a thin spot in the armor suit. Also punch up the seams and add some bolt holes showing where the padding could be fastened to a more comfortable layer underneath (**Fig.107**).

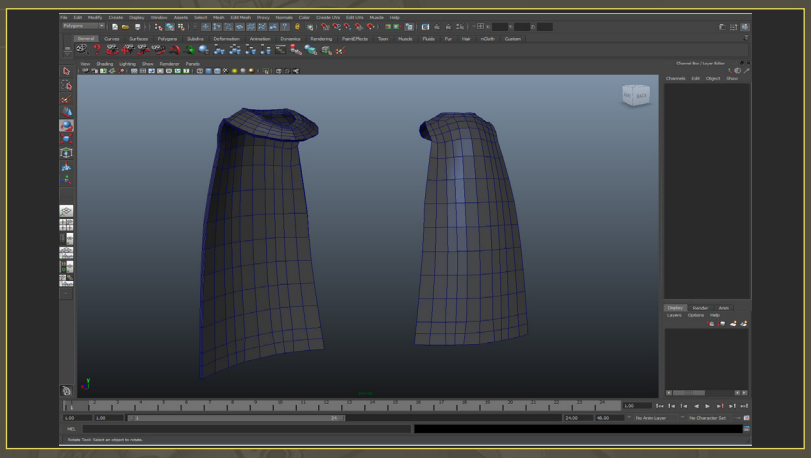


Fig 108

Here we can see the final sculpt all together (**Fig.108**).

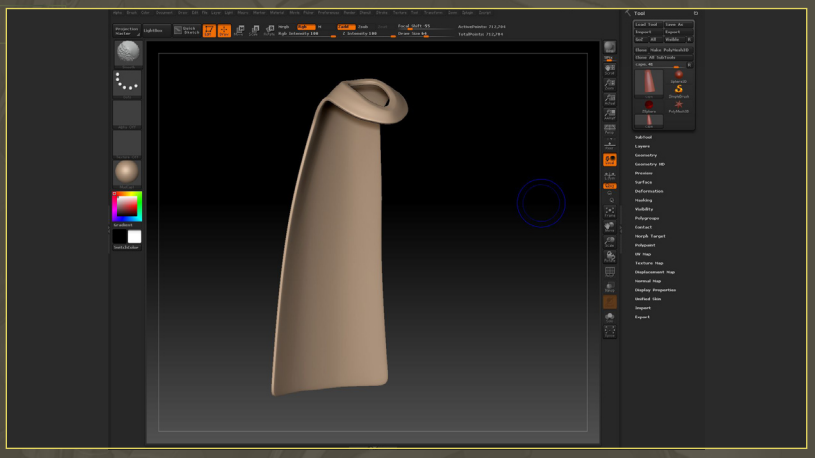
Now, we begin on the accessories. To start it off, make the cape base model. The base model for the cape is fairly straightforward. Using the character base mesh as a guide, create a loop of polygons and work loops out from there to cover the clavicle and work down the back. Remember to curve the cape slightly as it reached the calf area (**Fig.109**).

Fig 109



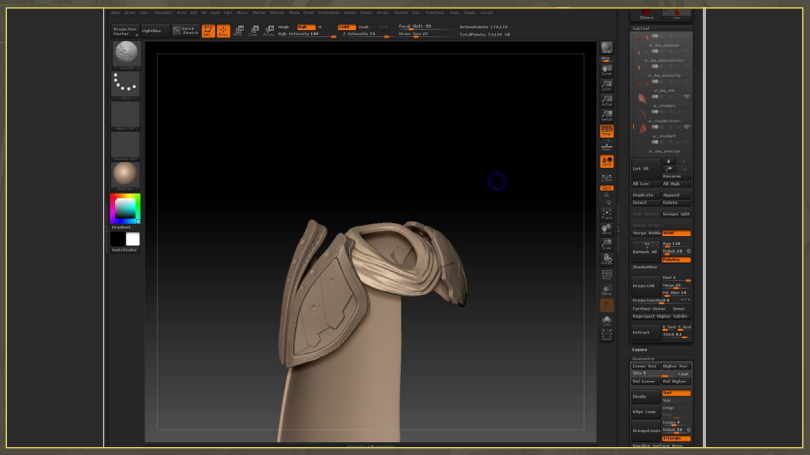
Append the cape model as a separate subtool for the sculpt we've been working on and subdivide it a few times (**Fig.110**).

Fig 110



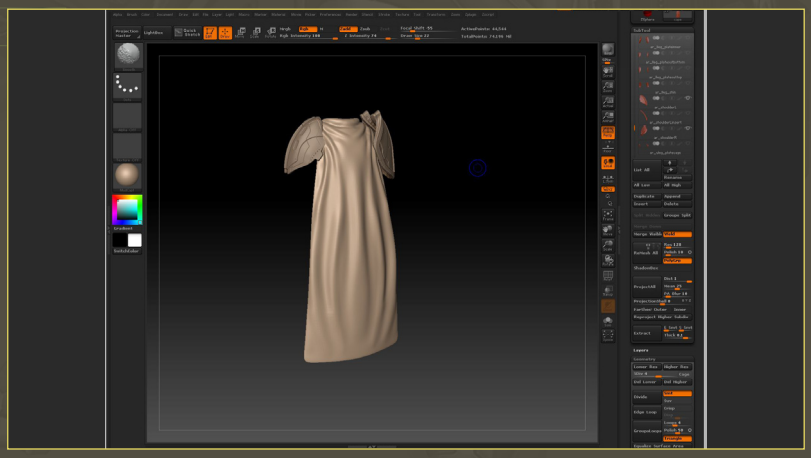
Now, begin working on bigger folds with a standard brush, keeping in mind how the fabric would bunch up around the neck when compressed (**Fig.111**).

Fig 111



Paint in large strokes that are tighter next to the neck and in broader, more subtle strokes towards the bottom. The reason for this is that the fabric would swing more freely if not compressed like it is next to the shoulders and, since the cape will eventually be rigged to animate, we want to have as few wrinkles as we can so that they don't conflict with how the cape would move and compress during animations (**Fig.112**).

Fig 112



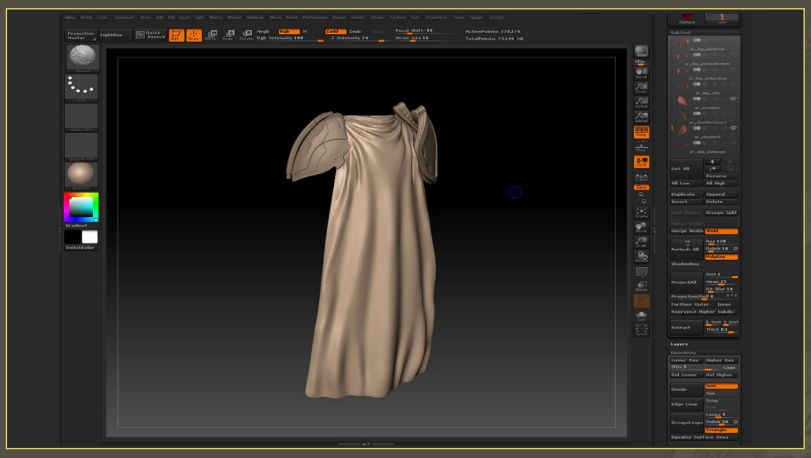


Fig 113

Once the folds are blocked in, increase the subdivision levels and refine the shapes with a tighter standard brush (**Fig.113**).

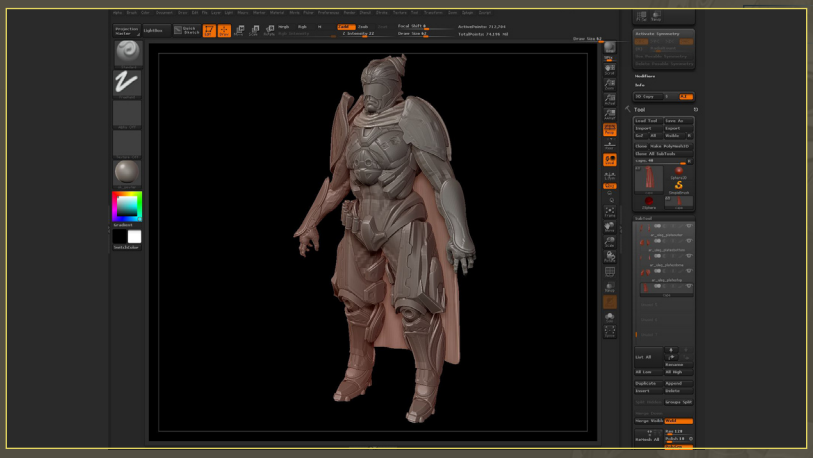


Fig 114

Here you can see how the sculpt will fit the final character (**Fig.114**).

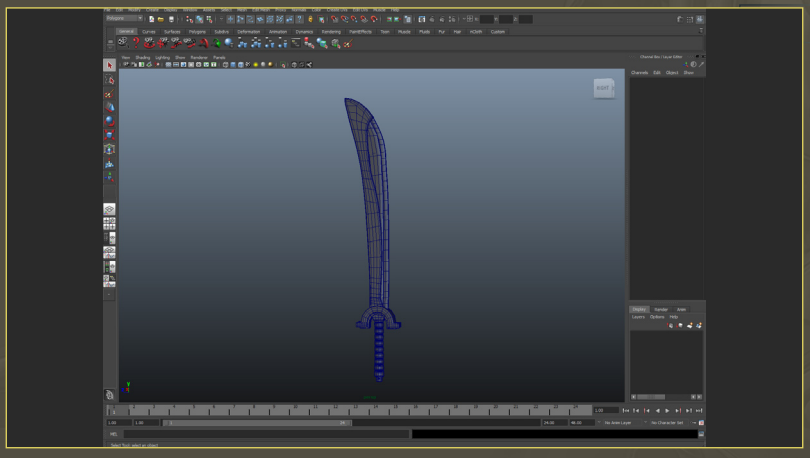


Fig 115

Now we move onto the character's weapons, which include a technologically advanced sword and a smaller gun for ranged attacks (**Fig.115**).

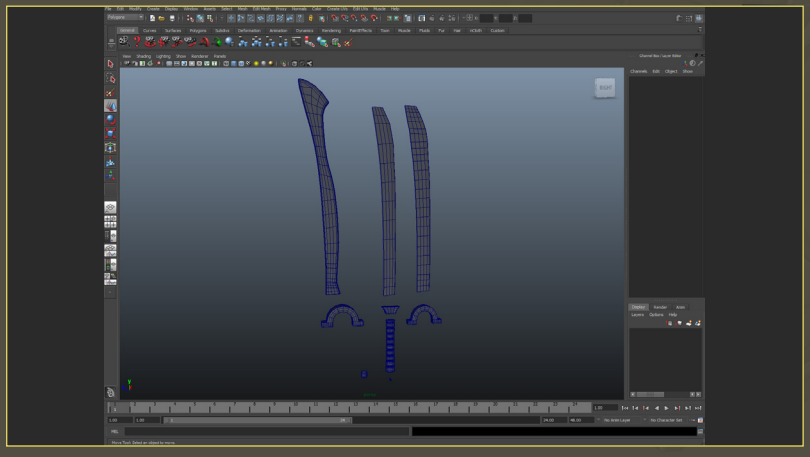
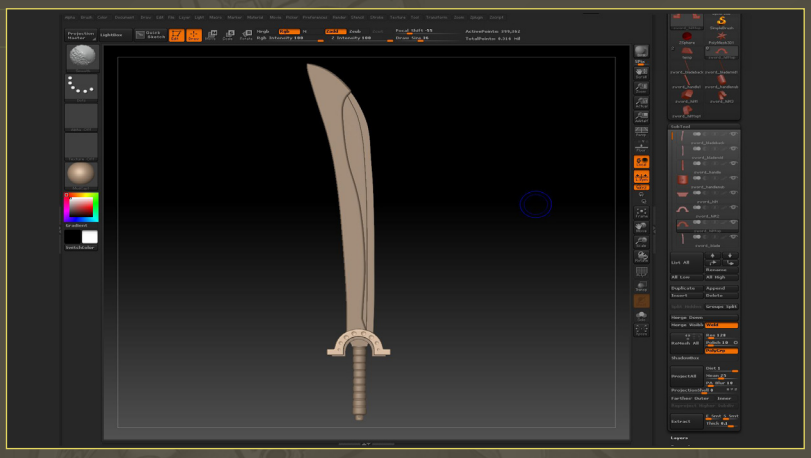


Fig 116

Much like the body armor, you can see that the sword is composed of many different elements. I find that it is just easier to iterate this way if need be, since different portions of the model can be swapped in and out, as well as maintaining edge fidelity since sculpting information won't bleed from one section to another. As you can see, I've tried carrying the armor style over into the weapons to give it a consistent look as if the entire set was issued to this particular warrior (**Fig.116**).

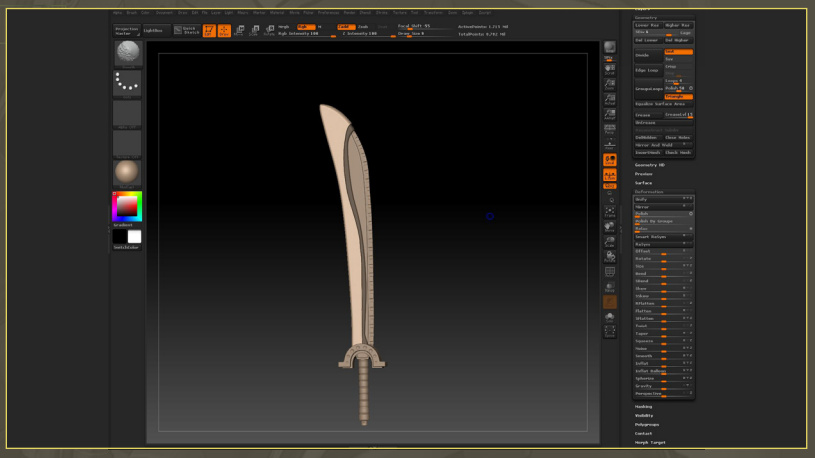
Import all of the separate models as OBJs and construct a new tool file by using the Subtool Master Multi Append feature. Once all of the models are brought in, subdivide them a few times and get to work on detailing up the sword hilt with tapered holes, which can also be seen in armor pieces on the character (**Fig.117**).

Fig 117



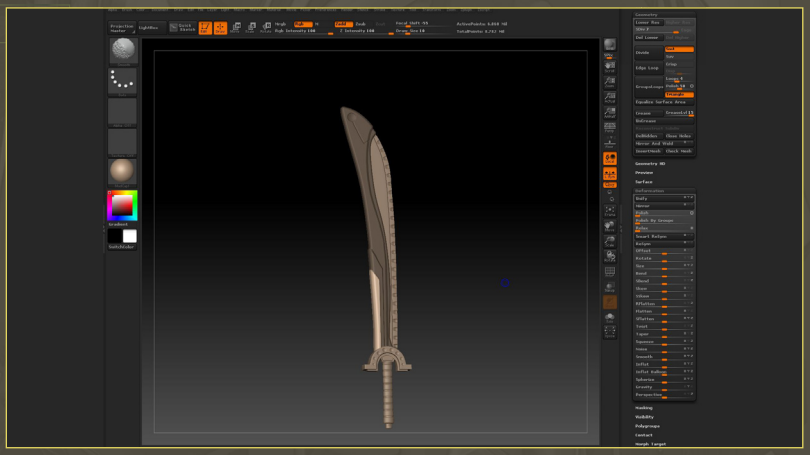
After this, freehand in a seam detail on the hilt and move onto the actual blade of the sword. On this plate, run a Stitch brush over the edge which has a tabbed alpha that will be used to create a serrated blade, which I think makes the blade look more menacing. Next, grab the plate that creates the back of the sword and mask in an insert that will act as a brace for the serrated blade (**Fig.118**).

Fig 118



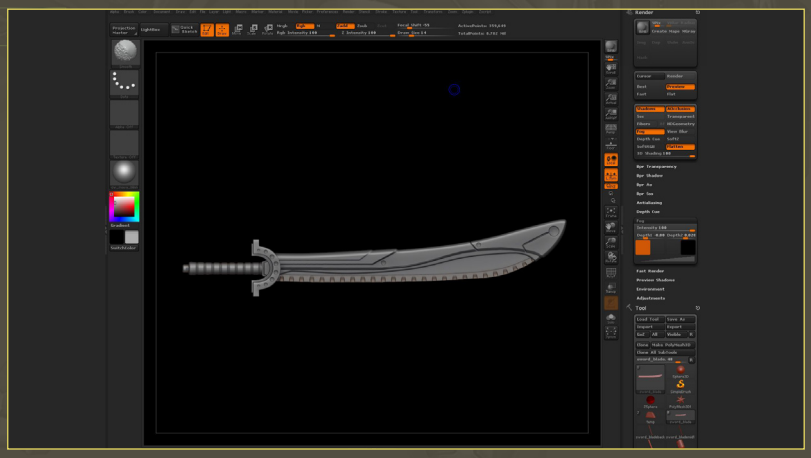
With this same section selected, mask out a layered plate effect towards the hilt and add a few accents towards the top of the blade (**Fig.119**).

Fig 119



This is the final sword sculpt with a more metallic material (**Fig.120**).

Fig 120



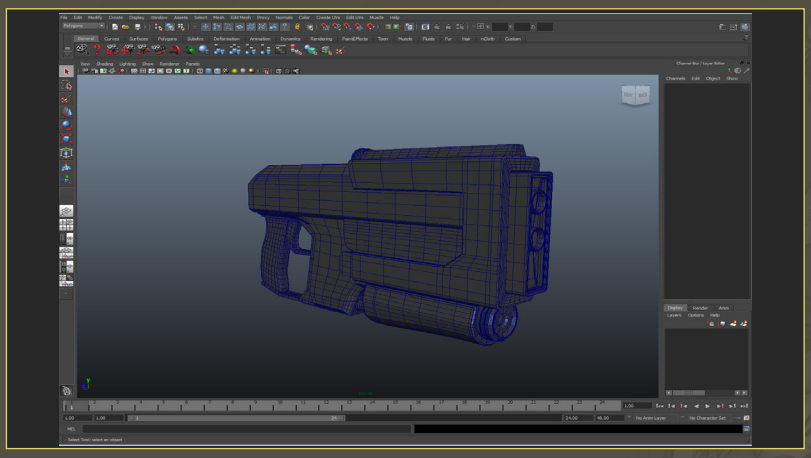


Fig 121

Now we move onto the gun, which is like a heavy duty machine pistol. The idea behind this gun is that it can be handled with just one hand, but also have the option to use the off-hand for stability. I think having a bigger gun that would require two hands would defeat the purpose of the sword and the Swordmaster (**Fig.121**).

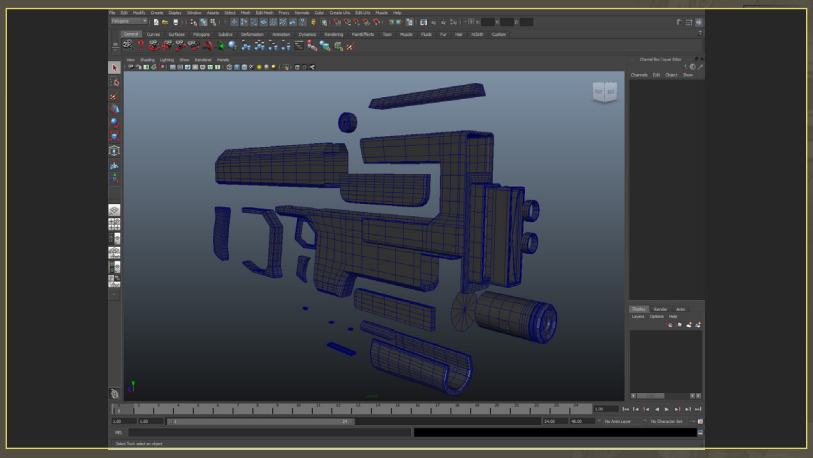


Fig 122

Like the sword and the armor suit, the gun is split up into many different elements which, for the most part, begin in the center and layer out to the top. Most of the shapes are fairly simple geometry and don't get too caught up in finer details (**Fig.122**).

Import all of the models using the Multi Append feature and begin a new sculpt. For both the gun and the sword, you can simply use the character model as a scale reference and handle the weapons as separate sculpt files so as to not bog down the character sculpt.

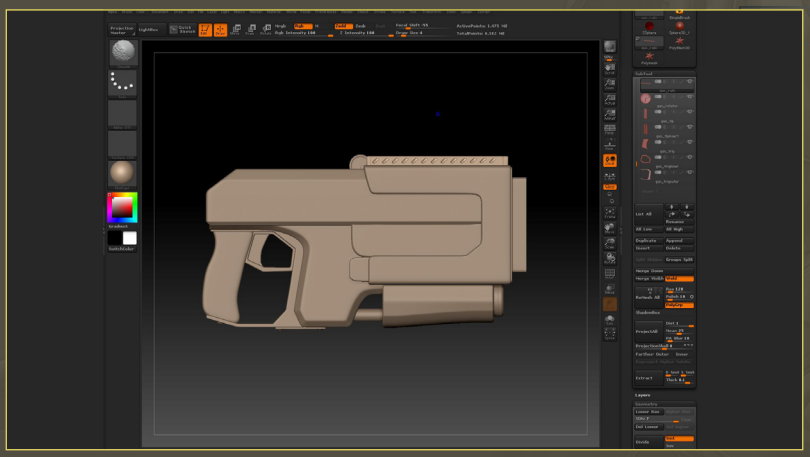


Fig 123

Begin the gun sculpt by using the stitch brush and a custom alpha, which consists of a rounded rectangle turned 45 degrees and faded to create the vents on the top rail section (**Fig.123**).

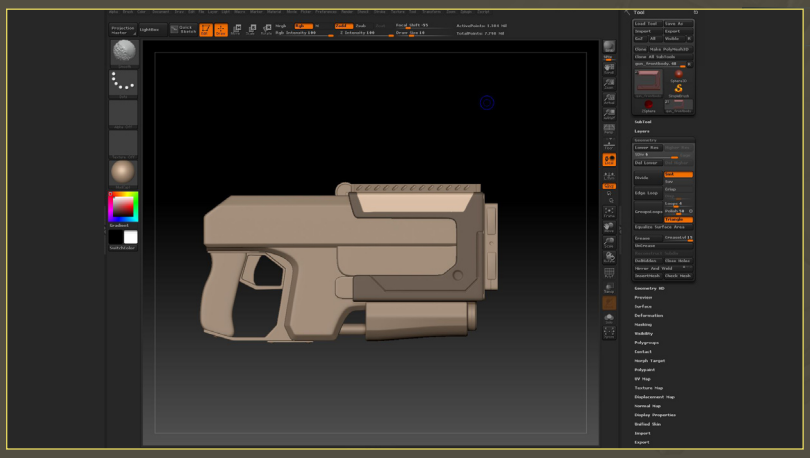


Fig 124

Next, lay down some surface details like seams and bolts. After this begin masking out sections to be pushed in and out of the gun body (**Fig.124**).

Continue on with surfaces details, adding rivets, seams and a serial number plate. Moving on to the gun front grip, mask out sections as I have done and draw the rubber grip bubbles with a Stitch brush to keep the spacing even. Once a stroke with any brush has been started, if you hold down Shift it will lock the brush and

allow you to paint in a straight line. Of course, pressing Shift before the stroke just activates the Smooth brush (**Fig.125**).

Next, drop the model using Projection Master and lay down details such as the top slots and smaller panels. These use custom alphas we have already used and stock alphas from the standard ZBrush alpha library (**Fig.126**).

From here, paint in vents, like on the rail, with a Stitch brush using the same alpha. You can rotate, invert or flip an alpha image in the Alpha tab at the top of the screen. This helps save time as you won't need to alter your alpha in Photoshop.

Moving on to the grip, mask out a section and inflat it with a negative value to bring it more flush with the trigger area. Also draw in a bolt using alphas that we have already created and mask and inflat the rubber grip section of the handle (**Fig.127**).

Finally, add finishing touches like cleaning up seams, the rubber grip and scratches from wear and tear.

This completes the high resolution modeling portion of the series. From here, we will be moving on to the game resolution model and will be covering topology, deformation and polycount (**Fig.128**).

Fig 125

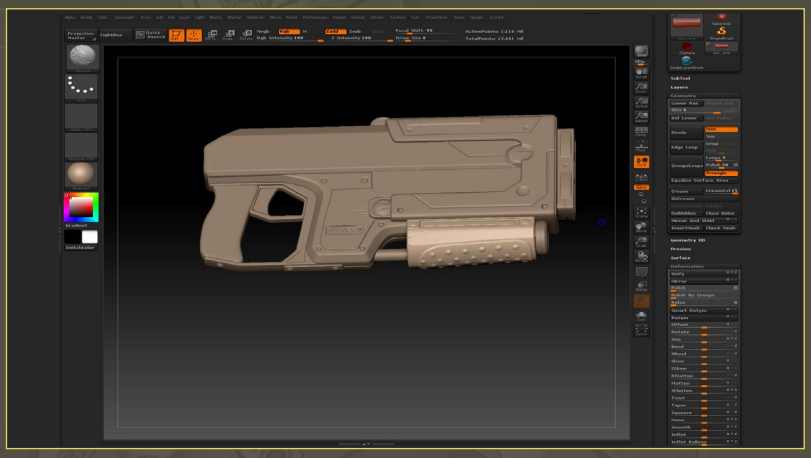


Fig 126

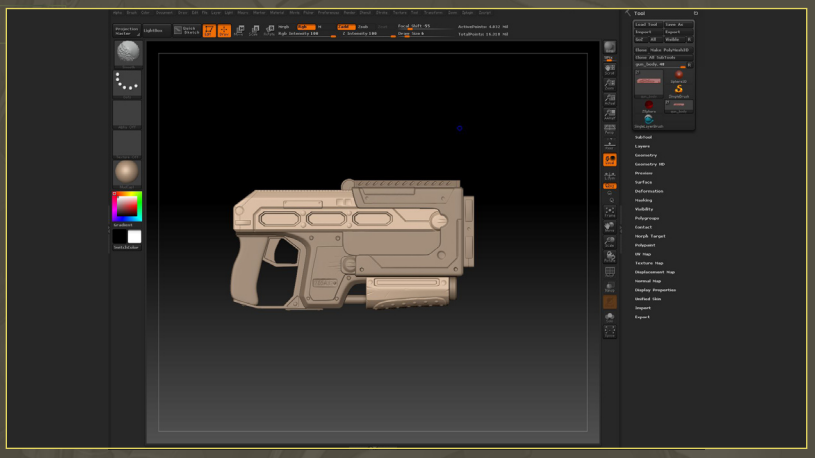


Fig 127

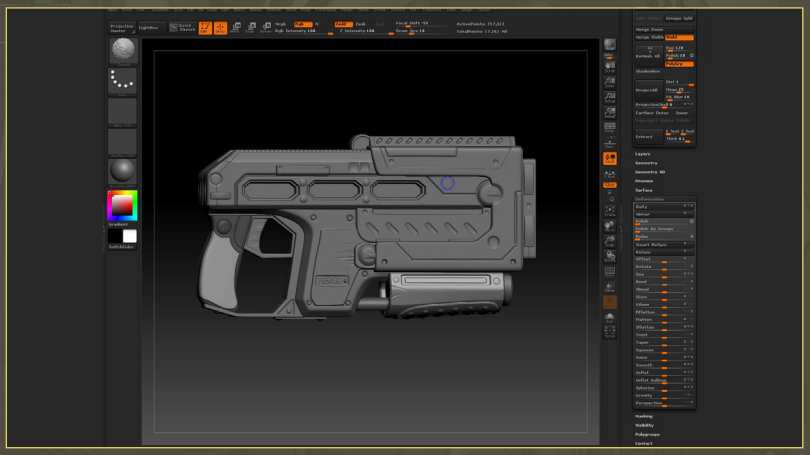
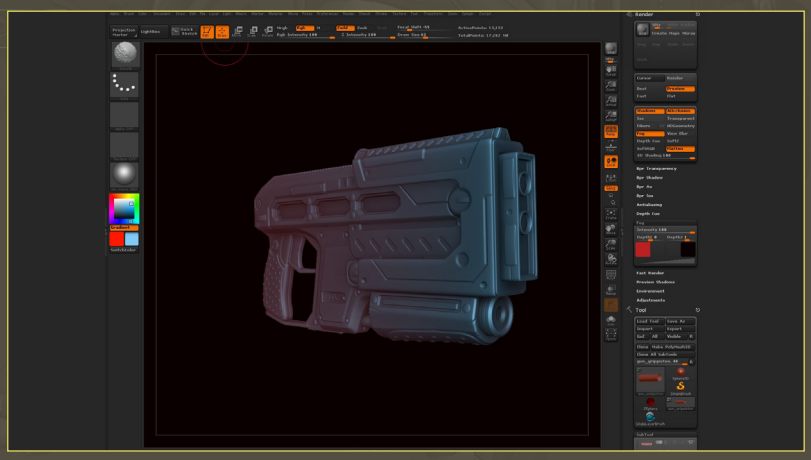


Fig 128



Gavin Goulden

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